'68' MICRO JOURNAL

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VOLUME III ISSUE III • Devoted to the 68XX User • March 1981

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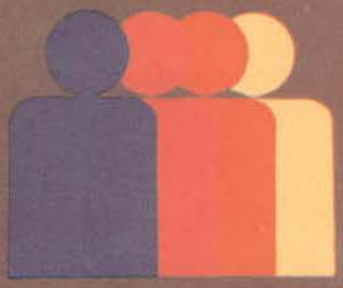

Multi-User

UniFLEX is the first full capability multi-user operating system available for microprocessors. Designed for the 6809 and 68000, it offers its users a very friendly computing environment. After a user 'logs-in' with his user name and password, any of the system programs may be run at will. One user may run the text editor while another runs BASIC and still another runs the C compiler. Each user operates in his own system environment, unaware of other user activity. The total number of users is only restricted by the resources and efficiency of the hardware in use.

Multi-Tasking

UniFLEX is a true multi-tasking operating system. Not only may several users run different programs, but one user may run several programs at a time. For example, a compilation of one file could be initiated while simultaneously making changes to another file using the text editor. New tasks are generated in the system by the 'fork' operation. Tasks may be run in the background or 'locked' in main memory to assist critical response times. Inter-task communication is also supported through the 'pipe' mechanism.

Support

The design of UniFLEX, with its hierarchical file system and device independent I/O, allows the creation of a variety of complex support programs. There is currently a wide variety of software available and under development. Included in this list is a Text Processing System for word processing functions, BASIC interpreter and precompiler for general programming and educational use, native C and Pascal compilers for more advanced programming, sort/merge for business applications, and a variety of debug packages. The standard system includes a text editor, assembler, and about forty utility programs. UniFLEX for 6809 is sold with a single CPU license and one years maintenance for $450.00. Additional yearly maintenance is available for $100.00. OEM licenses are also available.

FLEX™

UniFLEX is offered for the advanced microprocessor systems. FLEX, the industry standard for 6800 and 6809 systems, is offered for smaller, single user systems. A full line of FLEX support software and OEM licenses are also available.

technical systems consultants, inc.
Box 2570, West Lafayette, IN 47906
(317) 463-2502 Telex 276143

'68' MICRO JOURNAL

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Southwest Technical Products
219 W. Rhapsody
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EDITOR - WORD PROCESSOR
Technical Systems Consultants, Inc.
Box 2573, W. Lafayette, IN 47906
FLEX is TM of TSC

GIMIX Super Mainframe-Assorted memory boards
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Publisher: Don Williams Sr.

Executive Editor: Larry Williams

Subscriptions and Office manager
Mary Robertson

General Girl 'Friday'
Joyce Williams

Contributing Editors:

Dr. Jack Bryant
Dr. Chuck Adams
Dr. Theo Elbert
Dr. Jeffery Brownstein
Dale Puckett
Russell Gore
Ron Anderson
John Jordon
Dennis Womack

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Send All Correspondence To:

'68' Micro Journal
3018 Hamill Rd.
PO Box 849
Hixson, Tennessee 37343

— Phone —
Office: 615-870-1993
Plant: 615-892-7544

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2-80 Track (96TPI) Double Sided	808,960	1,000,000	1598.00

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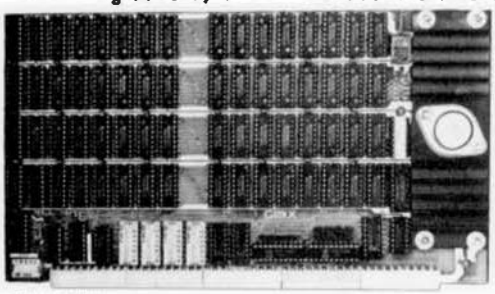

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SEE GHOST AD PAGES 33, 36, 39, 40, & 48

INTRODUCING

6809 SOFTWARE POWER TOOLS

BY MICROWARE®

OS-9™ MULTIPROGRAMMING OPERATING SYSTEM

A true multitasking, real time operating system for timesharing, software development, database, process control, and other general applications. This versatile OS runs on almost any 6809-based computer.

- UNIX™ like file system with hierarchical directories, byte-addressable random-access files, and full file security.
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- Powerful "shell" command interpreter features: I/O redirection, multiple job stream processing, and more. Includes a comprehensive set of utility command programs.
- *OS-9 Level Two* uses hardware memory management and can address over one megabyte of memory. Also includes pipes and filters for inter-process data transfers.
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☐ **OS-9 Level One Operating System $195.00***

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☐ **Special version for proportional printers $195.00**

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Extended BASIC language compiler/interpreter with integrated text editor and debug package. Runs standard BASIC programs *or* minimally-modified PASCAL programs.

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- Additional control statements for structured programming: IF ... THEN ... ELSE, FOR ... NEXT, REPEAT ... UNTIL, WHILE ... DO, LOOP ... ENDLOOP, EXITIF ... ENDEXIT.
- Allows user-defined data types and complex data structures. Five built-in data types: byte, integer, 9 digit floating-point, string and boolean.
- Outperforms any other BASIC on any 8-bit MPU.
- Available on disk. Runs under OS-9™ Level One or Level Two.

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Minimum-keystroke macro text editor useful for text preparation or interactive word processing.

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- Buffer, line and character oriented commands.
- Search, change and extend operations.
- Permits multiple input/output files.

☐ **Disk $95.00**

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Compact Motorola compatible assembler for machine language program development.

- Operates in "batch" mode *or* interactive line-by-line mode.
- Facilities for generation of OS-9™ memory modules and system calls.
- Formatted listings include syntax *and* context error checking.
- Runs on OS-9™ Level One or Level Two.

☐ **Disk $95.00**

OS-9™ INTERACTIVE DEBUGGER

Facilitates testing and debugging of machine- language programs.

- Includes common "monitor" functions: memory examine/change, breakpoints, display/change registers, etc.
- Calculator mode evaluates arithmetic expressions in hex, decimal or binary.
- Access to system commands.
- Available on ROM and disk.

☐ **Disk $35.00**

☐ **ROM (2716) $50.00***

Most software is available on ROM, and diskette in versions for many popular 6809 computers. Source listings and yearly maintenance/update service are sold separately for most programs.

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INNOVATION AND PERFORMANCE

6800 SOFTWARE SUPER POWER

BY MICROWARE®

A/BASIC COMPILER

This BASIC compiler generates pure, fast, efficient 6800 machine language from easy to write BASIC source programs. Uses ultra-fast integer math, extended string functions, boolean operators and real-time operations. Output is ROMable and *runs without any run-time package.* Disk versions have disk I/O statements and require 12K memory and host DOS.

☐ Disk Extended Version 2.1
SSB or FLEX* Diskette $150.00

A/BASIC SOURCE GENERATOR

An "add-on" option for A/BASIC Compiler disk versions that adds an extra third pass which generates a full assembly-language output listing *and* assembly language source file. Uses original BASIC names and inserts BASIC source lines as comments.

☐ SSB or Flex* Diskette $95.00

A/BASIC INTERPRETER

Here it is - a super-fast A/BASIC compiler! Now you can interactively edit, execute and debug A/BASIC programs with the ease of an interpreter - then compile to super efficient machine language. Also a superb stand-alone applications and control- oriented interpreter. Requires 8K RAM. The cassette version is perfect for Motorola D2 kits.

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The programming Language LISP offers exciting new possibilities for microcomputer applications. A highly interactive interpreter that uses list-type data structures which are simultaneously data and executable instructions. LISP features an unusual structured, recursive function-oriented syntax. Widely used for processing, artificial intelligence, education, simulation symbolic, and computer-aided design. 6800 LISP requires a minimum of 12K RAM.

☐ SSB or Flex* Diskette $95.00

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MIKBUG — compatible ROM that combines an improved monitor/debugger with a powerful multitasking real-time operating system. Supports up to 16 concurrent tasks at 8 priority levels plus real time clock and interrupt control. Thousands in use since 1976 handling all types of applications. Available on 6830 (MIKBUG-type) or 2708 (EPROM-type) ROM. Manual is a classic on 6800 real-time applications and contains a full source program listing.

☐ RT68MX (6830) $75.00
☐ RT68MXP (2708) $75.00

6800 CHESS

A challenging chess program for the 6800. Two selectable difficulty levels. Displays formatted chess boared on standard terminals. Requires 8K memory. Machine language with A/BASIC source listing.

☐ SSB or FLEX* Diskette $50.00

Our software is available for most 6800 systems on diskette unless otherwise noted. Phone orders welcomed. We accept MASTERCHARGE and VISA. We try to ship orders within 24 hours of receipt. Please call or write if you require additional information or our free catalog. Microware® software is available for OEM and custom applications.

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■ **Complete Formatting Control**

Text or individual lines can be center, left, right, or left-and-right justified; page and line width can be specified; multiple tabs can be set anywhere. You can define page heading, footers, page numbering, identation and line spacing.

■ **Versatile Video Terminal Interface**

The basic Stylograph module uses a "personality module" to define the display control codes used by many brands of video terminals and memory-mapped video displays including: Hazeltine 1400/1500 series; Lear-Seigler ADM3-A; GIMIX 80x24; SWTPC CT-82 and 8212; and ADDS Regent series.

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- Hemenway Associates Software Products for use under FLEX™ are available on the MSI System.
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Dataman

DATABASE MANAGEMENT

By Thomas L. Gilchrist

DATAMAN is a sequential file database system consisting of 16 menu driven programs plus the menu and some support programs. Some of its more important features are:

- Easy to use-requires no programming skill
- Easy to modify-straight forward approach
- Shell program with the main subroutine included!
- No limit to the size of the records
- SOURCE on disk for ALL the programs included!
- Easy to interface with other programs you may already have
- Works with any terminal thru a system file
- Uses TSC's for Sort/Merge instead of Basic for all sorts

PLUS MANY MORE . . .

System requirements-Flex™ operating systems-32K workspace-Dual 5" or 8" drives-TSC Extended Basic - if sorts are required TSC Sort/Merge

PRICE $149.95

Includes - Disk (s) with source and compiled programs-Users manual in a hard cover binder with a tutorial-sample database

JCP
Job Control Program
By Peter Murray

The JOB CONTROL PROGRAM (JCP) reads a text file that contains the necessary input for a program and then supplies this input to the program in the same manner that an operator would have normally entered it from the keyboard. A procedure file contains input for such calling programs as FLEX™, FLEX™ utility commands, and other development software.

UBJCP is used as a FLEX™ command within a procedure to load and execute another procedure.

'68' MICRO JOURNAL says "Every once in a while a piece of software comes along that indicates a quantum jump in the state of a[illegible] . . . such a program (is) JCP."

See Review in July '80 '68' Micro

INCLUDES SOURCE ON DISK **PRICE $89.95**

REMOTE
Intelligent Terminal Program
By Tom Speer

REMOTE allows use of 6800 or 6900 system as a remote computer, gives you access to time-sharing systems designed for home computer users, such as MICRONET or THE SOURCE. All you need is your FLEX™ based 68XX disk system, a serial interface, a modem, and REMOTE. REMOTE will support the New Thomas Instruments Modem Card.

INCLUDES SOURCE ON DISK **PRICE $39.95**

READTEST
English Text Analysis Program
By Dale Puckett

READTEST is a must for all writers and writing instructors. Reads prose from disk file and tells how well it was written. Reports number of lines, words, sentences, personal words, affixes, average sentence length. Individual reports pinpoint trouble areas. Overall index tells who can read it and who would print it. Fast 68XX object code. Runs in FLEX™. '68' MICRO JOURNAL points out that "(Readtest) is a yardstick with which you can gage your progress. You will find, however, even if you are already an experienced writer, that READTEST will keep you honest when you start rambling."

See Review in August '80 '68' Micro. **PRICE $54.95**

INCLUDES SOURCE ON DISK

ESTHER
An exercise in artificial intelligence
By Dale Puckett

ESTHER is Eliza plus. Artificial intelligence in pure 68XX code. ESTHER remembers names, drops them, uses the player's name, and even echos keywords. ESTHER identifies more than 75 keywords and uses almost fifty sets of replies. ESTHER features auto line length and runs in FLEX. She obeys TTYSET. She is both educational and fun.

INCLUDES SOURCE ON DISK **PRICE $39.95**

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IT'S ALL HERE

SOMETHING FOR EVERYONE...

SOFTWARE ANNOUNCEMENT

FREE NEWSLETTER

Jan. 21, 1981

For a limited time we are giving a [illegible] subscription to our newsletter. If you have purchased from us in the past you may already be receiving it. If not, call or send in your name and we will be happy to put you on the list.

I have been told that with every purchase we should give a free magnifing glass so that you can read our ad. As you can see we are trying to cram a lot into too small a space and this is just the beginning! We are currently working on more than 20 PACKAGES for release. This means that we will not be able to fit everything into a one page ad. Before too long we will have to go to [illegible] it still not good enough. With our newsletter we can cut the leadtime to just weeks. What we plan for the newsletter is not just information about our programs but tips on using them, articles, hints, and other software and hardware that we use, etc.

In order to encourage you to [illegible] we will offer [illegible] on software from time to time to newsletter [illegible]. If the sales generated are enough to pay for the newsletter, we will not have to charge for it. That is why it's FREE for now. Of course, there is no obligation on your part, we just think that this is a good way to sell software. So don't delay send in your name now.

SOFTWARE UPDATE

As of Jan. 21, 1981 This is the disposition of the software we advertise.

READTEST and ESTHER are being shipped in both 6800 and 6809 versions now.

JCP is being shipped in 6800 versions and a preliminary 6809 version now. We have the final 6809 version in test and hope to ship by late March.

REMOTE is being shipped in 6800 versions with a preliminary manual and temporarily shipped in reassembled 6800 code for the 6809. The 6809 vesion is about 1/2 done with the version for the Thomas board to come after that.

DATAMAN is on hand in final testing. The manual has all but the tutor section done. We hope to ship by mid February.

HELP for the 6809 is done and in final testing. The manual and 6800 code should be done by March 1. Thanks to Dale Puckett for the help in getting this very powerful program done.

X-FORTH is done for the 6800 and in final test for the 6809. The manual is currently being reorganized and all packages should be done by the end of Feb.

CC-FORTH for the TRS-80 color computer is in the design stage now. The hardware should be ready by Feb. but because this is our first venture into Firmware I can't give a better guess at this time.

We have established a NEW POLICY for announcing software for release. We will not advertise software until it is very nearly ready for release and we will tell you as we have done in this ad what stage we are at. If you want timely information on coming software releases, put you name on our list for our FREE newsletter.

X-FORTH
FLEX COMPATIBLE FORTH
By Dr. Charles E. Eaker PhD.

X-FORTH is a totally FLEX compatible enhanced version of FIG Forth. You can use the same files and file structure as TSC BASIC and XBASIC or any other FLEX compatible software. X-FORTH can reside on your system disk [illegible] any other FLEX command.

I won't go into detail here about the faster disk access or the faster program execution available with X-FORTH or the small amount of memory used. If you've been reading the articles about FORTH you are already aware of some of them now. But I do want to bring to your attention some of the things in this package.

First let me give you a list of what you get for your money.

1) X-FORTH an enhanced version of FIG FORTH that is FULLY FLEX compatible.
2) [illegible] with MACRO capability and [illegible]
3) TTY EDITOR
4) FULL SCREEN EDITOR
5) DATA FILE VOCABULARY that allows you to Create and work with ALL types of data files on disk. You can have ONE file that [illegible]

The disk also contains such things as a Mixed Magnitude Math Package and many utilities to make this one of the most complete FORTH packages available. If you check our price against others in the market you might wonder why it's so low and I'm going to tell you.

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A preview of X-FORTH and DATAMAN will be the highlights of our first issue of the newsletter.

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All software is currently available on FLEX™2.0 5"soft sectored disks and DMAF 8" Flex disks. The package includes: a users manual, disk with object code, FULLY COMMENTED SOURCE LISTING, a programming manual with information about the program, hints for changes and where applicable, example programs. VISA and MC accepted. SOURCE TCF339 Add $2.50 for standard UPS Shipping and Handling. DEALER INQUIRY ENCOURAGED, Contact Frank Hogg for more information.

ATTENTION PROGRAMMERS!

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Epson MX-80 Print Sample

Shown are five of the twelve possible variations of print characters.

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P.O. Box 794 Hixson, TN 37343
1-615-870-1993

10 CPI Standard

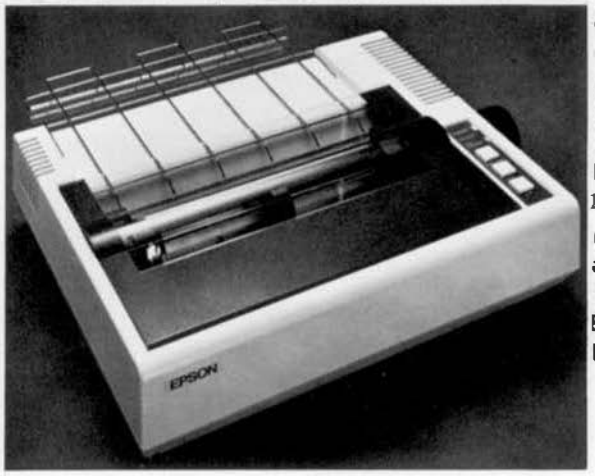
```
ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyzabcdefghijklmnopqrstuvwxyz
1234567890!#$%&'()*=+<>?1234567890!#$%&'()*=+<>?
EPSON MAKES MORE PRINT MECHANISMS THAN ANYONE ELSE IN THE WORLD.
Epson makes more print mechanisms than anyone else in the world.
```

10 CPI Emphasized

```
ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyzabcdefghijklmnopqrstuvwxyz
1234567890!#$%&'()*=+<>?!#$%&'()*=+<>?
EPSON MAKES MORE PRINT MECHANISMS THAN ANYONE ELSE IN THE WORLD.
Epson makes more print mechanisms than anyone else in the world.
```

5 CPI Double Emphasized

```
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890;-!#$%&'()*=+<>?
EPSON MAKES MORE PRINT MECHANISMS
Epson makes more print mechanisms
```



8.25 CPI Double Emphasized

```
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890;-!#$%&'()*=+<>?
EPSON MAKES MORE PRINT MECHANISM
Epson makes more print mechanism
```

16.5 CPI Standard

```
ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyzabcdefghijklmnopqrstuvwxyz
1234567890!#$%&'()*=+<>?!#$%&'()*=+<>?
EPSON MAKES MORE PRINT MECHANISMS THAN ANYONE ELSE IN THE WORLD.
Epson makes more print mechanisms than anyone else in the world.
```

Print method	Serial impact dot matrix
Print Rate	80 CPS
Print Direction	Bidirectional
Number of Pins in Head	9
Matrix	9x9
Line Spacings	1/8", 1/6", 7/72", plus programmable
Throughput at 10 CPI	Logical seeking function— 105 LPM, 20 character line; 75 LPM, 40 character line; 46 LPM, 80 character line

PRINTING CHARACTERISTICS

Character Set	Full 96-character ASCII with descenders
Graphics Characters	64 block characters
Printing Modes	Standard Double (advance Paper 1/2inch and repeat line) Emphasized (shift right and double strike) Double Emphasized (combination of above)

PRINTING SIZES

	Characters per inch	Max. Characters per line
Normal	10	80
Normal Expanded	5	40
Compressed	16.5	132
Compressed Expanded	8.25	66

FORMS HANDLING

Line Feed	Programmable length 1 to 85/72nds
Form Feed	Programmable length to 66 lines
Horizontal Tab	To 132 positions
Vertical Tab	To 64 positions

MEDIA HANDLING

Paper Feed	Adjustable tractor-type pin feed
Paper Width Range	4" to 10"
Number of Parts	3
Paper Path	Rear

INTERFACES

Standard	Centronics-style 8-bit Parallel
Optional	RS232, IEEE488
Buffer Size	1 line

SWITCHES LIGHTS DETECTORS

Indicators	Power Light; Printer Ready; Paper Out; On Line
Switches	Power On/Off; On Line; Form Feed; Line Feed
Detectors	Internal buzzer (bell) responds to Paper Out and error conditions with a generator 3-second tone for 30 seconds

RELIABILITY

Print Head Life Expectancy	50 to 100 x 10⁶ characters
MCBF (Excluding Print Head)	5 million lines

INKED RIBBON

Color	Black
Type	Cartridge
Life Expectancy	3 Million characters

ENVIRONMENTAL CONDITIONS

Operating Temperature Range	41°F to 95°F
Operating Humidity	10 to 90% non-condensing

POWER REQUIREMENT

Voltage	115v, 60Hz
Current	<1 amp
Power Consumption	100 VA maximum

SELF TEST MODE

Open-top Line Feed Switch while turning power ON engages self-test which prints all characters in ROM.

PHYSICAL CHARACTERISTICS

Height	4.2"
Width	14.7"
Depth	12.9"
Weight	12 lbs

Specifications subject to change without notice.

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$55 IEEE Interface

The world's first *disposable* print head.
This is the feature that will rank as "most imitated" over the next few years.

The product of three long years of R&D, the MX-80 features many performance breakthroughs, including the world's first disposable print head. It's conservatively rated at a full 50 to 100 million characters, but service is as simple as changing a ribbon cartridge. Snap the head out. Throw it away. Snap in a new one. It's that easy. The only tool you need is at the end of your arm. Anyone in your office can do it. And the replacement head costs less than 30 bucks. Think about service requirements. Mean Time To Repair. Downtime. This feature is a real breakthrough, and heralds an unprecedented level of serviceability and dependability for the office or home.

Correspondence quality printing.
A lot of printers costing a lot more can't touch the MX-80's performance. It gives you a choice of 40, 80, 66 or 132 columns of printing in as many as four distinct printing density modes, a total of twelve different combinations which can accommodate nearly any printing requirement. More than half of these utilize multi-strike and/or multi-pass techniques to generate "correspondence quality" printing. It's perfect for manuscripts, mailing labels, proposals, and nearly any other function where you need attractive, clean, clear, well-formed characters. So long as you're not trying to fool someone into thinking that you actually typed a document or letter. The MX-80 can handle nearly all of your text processing requirements.

A fully loaded printer at a bare bones price.
It's quite a machine. Bidirectional printing. Logical seeking of shortest lines. 80 CPS. 64 graphics characters. Forms handling. The list of standard features goes on and on. The fact is that there are few printers that can compete with the MX-80 at ANY price. And none—ZERO—in its extraordinarily affordable price range. Total performance coupled with Epson's legendary quality and reliability. The Epson MX-80. It's the printer you've always wanted.

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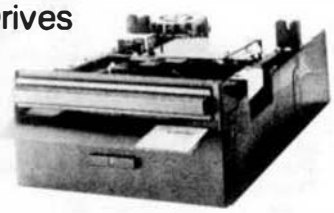

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Flex User Notes

BY: RONALD W. ANDERSON
3540 STRUBRIDGE COURT
ANN ARBOR, MI 48105

COMPILERS COMPARED

A few months ago, I wrote a thing on "The Perfect Compiler". Since then, none has arrived that meets all the criteria put forth there. This time, I have some hard data that will allow comparison of some of the compilers available for the 6800 and 6809. I've not distinguished here between the '00 and '09 versions, since most are available either way, and the results (contrary to Motorola's pitch) are not very different anyway, partly due to the fact that most of the 6809 versions are simply reassembled 6800 code that has not been rewritten to take advantage of the 6809's instruction set.

There are a couple of factors involved in deciding how "efficient" a compiler is. The size of the required runtime package is one of them. In case you came in late, a runtime package is a body of program that contains subroutines etc. used by your "user" program when it is run. The second is of course, the size of the user program generated from your higher level language input. A look at the data will show that, again, there is no one "best" compiler. My "test" program is one that finds the prime numbers from 1 to a limit specified by you. The integer compilers usually limit this upper number to less than 32767. The test run times are for finding the primes from 1 to 1000. There are 169 prime numbers in this range. The times listed include printing the numbers on my CRT at 9600 baud. The situation is further obscured by the fact that some of the compilers have a "fixed size" runtime package and others have variable packages most allowing you to specify which parts you need in several "chunks". For example, STRUBAL+ allows you to leave out the floating point Arithmetic package if you only need integer, and to delete the Scientific function package too.

COMPILER	PRIME	BYTES/PAGE	RUNTIME SIZE
PASCAL*	12 SEC	504	6500 BYTES
STRUBAL	12 SEC	1155	4400
SD BASIC	33 SEC	535	9000
TSC "	43 SEC	Interpreter for comparison	
FOLLOWING ARE INTEGER ONLY COMPILERS			
A/BASIC	4 SEC	965	384 BYTES
SPL/M	6 SEC	797	NONE BUT USES FLEX
FORTH	12 SEC	500	8000

* Pascal is Lucidata compiler.

Software Dynamics takes first place for the largeness of its runtime package, but comes in very well in the ammount of code generated for the user program. This means that the SD compiler would show up very well for a very large program, on the order of 20 times the size of this test program. You will note, however, that Lucidata Pascal does better in both categories, and is in fact probably the most efficient of those shown for a large program. Strubal lies in a better position with the runtime package, and the file handling package could be left out, reducing the runtime to about 3200 bytes. Actually, my first test with Strubal and this program resulted in user code of 1155 bytes. If you have followed my previous rantings, you will remember my complaint about the inefficiency of user code generation with Strubal. I have Hemenway's Software Sourcebook on Strubal, and have entered the whole thing and made it work with FLEX2 recently. A quick look indicated a couple of areas where it would be easy to reduce the code generated, and I was able to save almost 18% in this Prime number program by making a couple of minor changes. I have been working on a strubal code optimizer that will look at the source code and generate some simple sequences of instructions for simple operations such as I=I+1 etc. So far, I have been able to reduce the code generated to about 780 bytes "automatically". The compiler has no "look ahead" feature and it compiles code for a simple operation as though there may be more to follow, and is therefore inefficient. It generated 28 bytes for I=I+1 when all that is required is LDX I : INX : STX I, which can be 7 bytes! Strubal is particularly inefficient at handling array references too. It used 70 bytes to do ARRAY(3,4)=17, and 41 bytes to do ARRAY(3)=17. Since these are very often repeated operations, an optimizer that streamlines the byte counts here will decrease the code considerably. I will keep you informed of my progress in this direction.

The integer compilers do very well indeed in the area of the runtime package size, but not as well in the user code generated areas, which means that they are optimal for small programs in the range of the Prime number program to about 5 times that size. SPL/M uses FLEX routines, but even if FLEX is ignored and the needed routines written in SPL/M, the total byte count for a small program is impressively small. SPL/M is, however, very "wordy", in that more lines of source code are required than most all of the other higher level language compilers here. It is closer to Assembler for that reason, and it should therefore be more efficient and perhaps for the same reason less desirable as a higher level language.

Regarding the execution times, STRUBAL with the optimization ran about 9 seconds, and is therefore pushing right down with the fastest of the compilers. It certainly beats the others with floating point capabilities. (It has 14 digit precision).

This discussion wouldn't be complete without a discussion of the languages themselves. One of them may be more suitable for a certain type of program than the others. For example, most games need only integer arithmetic. The only exception that comes to mind is Lunar Lander that calculates the position and velocity of a falling body with gravity and it's thrusters operating to provide accelerations. If a program requires lots of string operations, for example, a character by character scan of lines of text, the BASIC compilers are much easier to use than PASCAL which has virtually no inherent String manipulation functions built in. You may disagree, but, I think Pascal is easier to use if string functions are not too prevalent in the program. The use of names for Procedures (subroutines), and the advantages of parameter passing, plus the forced structure of the program make it easier to debug a program in Pascal than the other languages.

I still like to do a complex program in BASIC first (a BASIC interpreter). The reason is the ease of change without having to recompile the program each time. I find the translation from BASIC to another language to be very easy, and the debug in BASIC shows up the blind spots in my reasoning on first writing of the program. All the advocates of structured programming out there will probably boo me down, but I think I arrive at a working result faster if I get just anything close on paper and can look at it and find out why it doesn't work.

With all these qualifying factors in mind, I present the table. This is a table of the number of bytes of object code compiled per program page, the size of the initial runtime package, and the time to run my "standard" Prime number program. I've taken my

PRIME program as a standard page, which I agree is somewhat arbitrary, but since all the compilers worked on the same program (algorithm), the comparisons are valid at least for a program with this mix of arithmetic, array references and string functions. You will notice that some general conclusions may be drawn. The starting size in bytes is of course the runtime package size. A large per page byte count indicates an inefficient generation of user code and vice versa. It is fairly easy to look at the table and generalize that "The larger the runtime, the more efficient the user code generation". I would at least hope that to be true because a large runtime package should contain more subroutines to be called by the user program, and therefore the user program need not be as large.

We may make another generalization from the table. If the user program is fairly small, the size of the runtime package is the most important factor. A/BASIC generated over 900 bytes per page but had a tiny runtime package, and therefore is the clear winner out to about 19 pages of program, where the partially optimized version of STRUBAL+ takes over briefly out to 23 pages or so where PASCAL becomes more efficient. (Actually, A/BASIC has a variable size runtime package that grows to 1500 bytes or so as string functions etc. are used, so it is not quite as good as indicated here.) It won't take much further improvement in STRUBAL to get it to be the winner that takes over from A/BASIC in the range of 18 to 20 pages on up. Since this was written I've added FORTH to my software library. This is the FORTH for 6809 supplied by the FORTH Interest Group (Fig). The program is essentially three variable declarations and three program statements, which fit on approximately 8 lines. The economy of program statements is obvious. The speed is somewhat indicative of the fact that I'm not yet a very good programmer in FORTH. The program is not as optimized as the version for the other tests, and I would guess a fully optimized version would run in about 6 seconds. FORTH, as you have probably heard, is a language you will either love or hate. I suspect everyone hates it until they get the feel for it. If you give up before that point, you hate it permanently. Once you understand its notation and get used to it, you probably will like it. It is a "programmers language" the main virtue of which is efficiency of source program and reasonable speed and size. It is not a documentor's delight. As I indicated, I am just getting into it, and I will keep you informed about how well it works and how I like it in future columns.

JPC ANALOG TO DIGITAL CARD

I recently acquired a JPC A to D card in kit form and had no trouble getting it assembled and operative. This card, if you are not familiar with such things, will convert an input voltage between 0 and 5 volts, to a digital value between 0 and 255. Thus the resolution is about 1/50 volt or 20 millivolts. In addition it has a programmable gain amplifier at the input that may be programmed for gains of 5, 10, and 100. Also, the input is through an analog "multiplexer", a fancy name for a switch. This card allows 16 input signals to be connected, and under program control, any of them may be read. The gain may be different for each channel, also under software control. It was not very hard, using the supplied test program, to make slight modifications and have the input "autorange" feature. That is to say that the gain adjusts itself so that the signal is as large as it may be going into the A/D converter.

This converter will perform 3300 conversions per second, so that a great deal of data may be collected from several channels in a short time. The manual that comes with the kit includes several possible applications, and explains how to use the board for them. Included are temperature sensing and logging applications, a computerized voltmeter, data collection, etc. At $73, this card is an excellent buy. My plans include incorporating it in an application where it will be used to digitize a "noisy" signal for digital signal averaging. It could also be used with a Fast Fourier Transform program to do vibration analysis etc.

MINIFLEX USERS TAKE NOTE

I have lately received communications from several of you who are using Miniflex. Some of you are frustrated because there have been no listings here to run in Miniflex. As I have replied individually to some of you, neither TSC nor SWTPC support Miniflex any longer. I recall reading a letter from someone to '68' asking what that meant. What it means is that there will be no new software available in Miniflex version, and that further improvements and updates to Miniflex will not be made by those companies. It is sort of an announcement that "You are on your own now". If any of you are trying to run Miniflex and convert the published utilities, and you don't have the Miniflex Advanced Programmer's guide, you are in trouble. If you don't know how to use the guide you are in trouble too, unless you can find someone to help you.

Let me make it clear that we FLEX2/FLEX9 users have nothing against Miniflex at all. I used it quite successfully for a year or more and it was a real upgrade from the original FDOS provided early by SWTPC. I am presently "supporting" both the 6800 and 6809, each using both 5 inch and 8 inch disk drives. That means that I have 4 versions of FLEX up and running. If I had Miniflex too, that would be 5. Fortunately, the 6800 and 6809 disks are compatible at the text file level. I may edit a source file with either processor running, and may use either for text entry, editing and processing (I happen to have the 6809 going at the moment). Miniflex formatted disks may not be read, (not even the directory) with either of these FLEX versions, since the disk sector size is different. Most of us switched because FLEX2 offered some new features, and support was promised for some time to come. We were all frustrated at the pains of translating, moving files etc. that had to be done in order to get all our old software to run in FLEX2. I never did get some of my old software converted. I can fully understand that not all of us have on the order of $100 to put into our hobby just to gain that small increment of performance.

However, as I said to one person who wrote me, (not exactly in these words), if you want to be a "reverse pioneer", you must expect to have to dig out the information for yourself and make the necessary adaptations, or not use some of the newer software.

It has been my practice here, particularly with Utilities, to write them in the 6800 subset of the 6809 instruction set so that the program may be assembled with either of the assemblers without changing any instructions. I've stated before that all Flex references at hex addresses CXXX in FLEX9 are at the equivalent AXXX address in FLEX2, and similarly the DXXX addresses go to BXXX for FLEX2. Unfortunately there is no such simple correspondence in Miniflex. Miniflex doesn't have some of the routines used in these programs such as OUTADR for example, though these can easily be 'fudged' in Miniflex by using JSR OUTHEX INX JSR OUTHEX in sequence. The most difficult area of adaptation is in print routines. The new FLEXes require three routines at certain fixed addresses. These are, port initialization, printer ready test, and print character. Miniflex doesn't need the printer ready test, the routines may be at any address, and you must overlay address $10 with the address of your initialization routine.

If we have any professional or semi-professional (whatever that means) programmers out there who would be willing to answer questions and help some of those just getting started in computing with such Miniflex adaptation problems, please write me

and I will publish your name and address as a "resource person" for others to use for aid. Maybe someone out there routinely translates all the software in '68' Micro Journal that is applicable, to Miniflex anyway, and wouldn't mind sharing a copy or two of his efforts. I'm not trying to say "don't bother me" with such questions, it's just that I do this column in addition to a full time job, and I can see soon reaching the point of not being able to answer all the correspondence that I receive each month.

RUMORS & such

In my recent ramblings I have mentioned that APPLE blew it with their latest offering. Seems to be a klug of kluges. I have talked to many callers wanting to know about the 6809 adaptor for this machine. I was taken to task, by telephone, by an APPLE official(?) for telling my readers what a mess they (APPLE) had made of the latest offering. Of course they really don't have a lot of time to spend talking to me as they are sorta busy defending their latest position on selling software without 'any' warranty or maintenance. At least that is what some reports in other computer magazines indicate.

Despite all the garbage generated by this it seems that one of the larger software minicomputer houses, The Pick and Associates, has already begun to develop a whole new operating system for the APPLE. The only reason I mention it here is that it is for the MC68000. Their own management and engineering probably blew it, but their dealers and many customers realize that the latest APPLE is a hashed over affair with a past-generation CPU. The 6809 adaptor board (about 3 times faster than the 6502) and the coming of a 68000 machine, indicates that APPLE may be getting a message. Remember the saying "put your money where your mouth is".

If the stock buying public honestly knew the real value and utility of all the microcomputers available, the Standard S50 Bus machine manufacturer's stock would be worth a thousand times it's current value, according to what occurred in the recent APPLE stock offering.

Was also taken to task by the 'biggest' little computer manufacturer for some 'remarks' in my December RUMORS column. As was told, "I don't appreciate that". Checking some arithmetic on this, may take a few months, but will let you in on it, if it indicates that somebody's figures were wrong. I WANT TO REPEAT AGAIN - FOR THE RECORD - IF IT CAN ADVERSELY AFFECT 'MY' READERS OR ADVERTISERS, THEN I'M GOING TO PRINT IT. Thats what I get paid for. Track records are for real, nothing can change that.

Seems that there is a degree of incompatibility creeping in some of the newest Standard S50 Bus accessories. This can lead to a situation that will put the small software and some hardware vendors between a rock and a hard place. Although not on near as large or critical a scale, it does remind me in some respects, as to what I saw a few years back, as the S100 crowd began to unravel.

I clearly realize that those who manufacture the accessories we all buy and stick on our Standard S50 Bus computers are continually in a state of upgrade and 'keep up with the latest state-of-the-art' innovations. There is no doubt that we have the best microcomputer hardware and software available, for the Standard S50 Bus. We use the best MPUs available and also have a more hassle-free environment than any other bus or backplane configuration. Also I personally know that they all (manufacturers) are continually evaluating and testing newer and better(?) hardware items that are increasingly becoming more and more available. This is good for all of us. However, I certainly hope that those that decide to follow on this course will pause to ponder the effect it will have on us who buy the stuff. The most important thing that we have had going for us since day one was 'COMPATIBILITY', when that is gone, so are we and all those folks who sell us things for our computers. Seems that computer manufacturers, at least some, are beginning to follow a fatal path that is constantly trod by 'used-to-be' politicians, the path's name is 'Ignorethepast'.

Sure, I realize that some of the 'grandfather' hard/software could have been better. Hindsight is always 20/20. Some of it used protocols, code and hardware kinks that caused us headaches later. But at the time we got it, it sure beat anything else that was available! Some of the mistakes of the past still linger. But most of them ain't killing us. As long as we work within their constraints (in most cases) they and all that follow works.

Mikbug™ had a lot of not-so-hot features. Of course, at first, most of us didn't mind, IT WORKED! In fact some aspects of Mikbug™ were a real pain to work around, but one thing is certain, Mikbug™ kept us all 'compatible'. And those who were non-Mikbug™ never really got off the ground, at least not to the extent that the others did. Sure should tell somebody something! Where we are going to have some hurts put on us is when others do the job somewhat better (?) and then make all our old stuff non-compatible. The S100 bus received a bundle of 'improved' hard/software over the past four or five years. And some of those 'improvers' are now belly-up. So if your company is going to improver the Standard S50 Bus, or some of the stuff we hang on it, please then remember us little guys who bought your stuff when it wasn't so hot. Giving us software and hardware that is improved is great, but also PLEASE leave us a way, software or hardware, to run your stuff with the other fellow's peripherals and accessories!!! Again, the name of the game is "COMPATIBILITY".

This is a subject that I am deeply concerned about and would appreciate your dropping me a line and let me know how you feel. I know for a fact that all of the Standard S50 Bus manufacturers will be listening for what "YOU" have to say. After all, we know who will determine the future of the Standard S50 Bus. Right, you and me, the BUYERS!

Now I will climb off the soap box and get on with other rumors(?). From SWTPC comes rumors that they will soon have a single unit 64K(?) 6809 computer. No additional info at this time but will keep you informed as I hear about this new addition to their line of computers. Also from SWTPC is rumored a new 64K dynamic memory board that will run 1 or 2 MHz, and a 'streamer' type tape system for those who have a need for tape backup (especially those wishing to unload the SWTPC winchester), price will be under $2,000 so I am told.

A word of Caution! Have been informed that the 6809E used in the Radio Shack TRS80C™ is NOT a 'standard' LSI. Seems that Tandy had some special 6809E versions masked, these do not contain features that the TRS80C™ does not require. Mostly communications functions. This may have been an early product situation only. Will try to find out if the regular E versions will be used when they become available. Also the Extended BASIC was delayed due to Microsoft being late with delivery of the code to Tandy, and the Christmas holidays delayed Motorola for a couple of weeks, so I was told. Radio Shack claims delivery of over 10,000 of these unit up to the first of the year. Now, if these users want to step up to a more powerful computer, I know about some mighty fine 'full blown' 6809 machines. Just check the ads in 68 Micro Journal!

Now that the hostages have been released, I can tell you what we did and will do or not do, concerning that frustrating period. When it started, first week I cancelled any subscriptions going to Iran. We will refuse any business with Iran. Also I will NOT accept any advertising from anyone who does business with or in Iran. Earlier one advertiser (not any more) informed me that they felt this was 'not really any of my business' and they thought trade with Iran was necessary or desirable. I guess they need all the business they can get, regardless, not us! I know it is less than "a drop in the bucket" but it is our policy and I do not see any change coming in this attitude! If you feel different, just let me know and I will be happy to publish you opinion. Maybe it is of little importance, what a small magazine does, but thats the way it is.

By the time you read this I should have information (and a system) of a 5 megabyte winchester for the Standard S50 Bus. Will get some info (should be ads also) in the next month or so. Total price of the unit should be about same as average 8" disk system, or less. So, twice the storage for less, things get better and better for the Standard S50 Bus every day. Will let you know.

Speaking of things getting better..... I receive calls from purchasing agents and others who have become interested in Standard S50 Bus computers. They are probably sold (personally) on the Standard S50 Bus and computers that use it. But they all keep bringing up the same question. They want to know why the Standard S50 Bus has not been declared 'official' somewhere, by someone (other than just 68 Micro Journal). A problem exist in that many companies and government agencies are caught up in the myth that if a certain type of equipment or device is *not* 'officially' classified as being a 'standard' then it is lacking in something. This may not seem much of a problem unless you deal with these folks, as we do on a daily basis. There is a kind of 'official sanction' that goes with a 'standard'. And therein is where the rub is; WE ARE MISSING A BIG PART OF THE MARKET!! Even for the hobby user this should be important, for the better you manufacturers do, the better the product we buy from you should be. Growth and volumn should bring greater profit and more funds to expend on research and quality control (which we could use).

Some years back, while doing private research, I was initially contacted about serving on a 'standards committee'. At the time I was too preoccupied with putting 'bread' on the table and little else mattered. Not that I have lost that need but now I do have a little more time to devote to matters of that sort. I would be more than willing to attempt to get something going; but I don't know how. So, if some of you have experience in this subject I would appreciate your contacting me and let me know what is needed. Maybe with some sort of 'joint effort' we can get something started. The most diffucult part of most projects is getting started, and with some expert or experienced advice, well maybe..... One thing for certain, it would greatly benefit us all, the buyers are becoming more sophisticated and demanding. Things just are not what they used to be.

OMW —

DATRICON SBC

The Datricon Single-Board Computer

Though it won't work in your S-50 bus system, the Datricon ACS 12 (manufactured by Datricon Corp., 7911 N.E. 33rd Drive, Portland OR 97211) is still of interest to readers of '68' Micro Journal because it uses the 6800 processor ... and because it provides a version of the FORTH language in a small package.

The computer is a strictly industrial - quality printed circuit board which measures 4.5 by 9.5 inches. It has a standard 56-pin card-edge connector along the edge, and is designed for the STD bus so widely used in industrial control. (Datricon has other STD bus devices available, including backplanes, instrument cases, extender boards, and interface drivers/isolators.)

The high-quality card is crammed chock-full of circuitry. The 6800 processor, with its 6875 clock generator, is in the center of the card, and runs at a clock speed of 921 kHz. On one side of the processor is the I/O area, on the other side is the memory and bus interface area.

On the memory side are five 28-pin sockets which can accomodate a wide variety of different ICs, both 24-pin as well as 28-pin. This includes the familiar 2716, 2732, or even 2764 EPROMs; 4118, 4816, and 4864 RAMs; and even mask-programmed ROMs such as the 8K capacity MK37000. Each socket has several programming jumpers so it can be adapted to any one of 19 different ICs. Depending on the ICs plugged in, these five sockets could hold as much as 40K of memory.

The standard card, as supplied with Datricon's OFORTH language system, contains two 2716 EPROMs and one 4118 RAM, for a total of just 4K EPROM and 1K of RAM. This leaves two sockets empty for the addition of more memory if desired.

Surrounding the memory sockets are address decoders and buffers, as well as the drivers and transceivers for communicating with the STD bus.

The I/O side of the board has both parallel and serial interfaces. Both of these use ICs from the 6500 family, rather than traditional 6800 family devices.

Serial I/O is handled by the 6551 asynchronous communications interface adapter, rather than the 6850 usually used in 6800 systems. The 6551 has all of the functions of the 6850 ACIA, plus a built-in programmable baud rate generator. Not only does this save some space on the board by eliminating the need for an external baud rate source, but it also makes it possible for software to adapt its baud rate to that of the terminal it is used with.

Parallel I/O is handled by the 6522 versatile interface adapter, rather than the 6820 or 6821 PIA one usually sees in 6800 systems. The 6522 includes two 8-bit ports and associated handshaking lines, like the 6820, but also adds two 16-bit programmable timer/counters and another serial data port.

The timer/counters can be used to provide interrupts at specified time intervals, or to count pulses on one of the input lines.

I/O connections are made via two connectors; the VIA parallel ports and handshaking lines are brought to a 50-pin header for connection to a ribbon cable, while the ACIA serial port goes to a 25-pin RS-232C connector at the edge of the board. A header plug nearby allows the serial port connections to be modified as needed for compatibility with modems or terminals which require various handshaking protocols.

Datricon's version of FORTH is called OFORTH, and is intended to be the main programming language for process control applications, the main use for this computer. Forth was initially developed by C. H. Moore of the National Radio Astronomy Laboratory, and was intended to be a replacement for assembly language.

OFORTH starts with a built-in set of 'words' which are pre-defined in the system; these include operations such as + or -, as well as some more specific I/O oriented words such as SETBIT or TSTBIT.

Altogether, there are over a hundred such words in the OFORTH vocabulary.

Programming in OFORTH is done by defining new words, in terms of existing words, and placing them in OFORTH's dictionary. Further definitions of new words can use previously defined words, until at some stage we reach a point where a single word describes the entire program to be executed. At that point, the 'word', or really the program that is to be run, is executed simply by typing in its name.

In a way, this is structured programming, except that it might be called bottom-up rather than top-down programming. That is, the words are generally defined starting from the most primitive, and proceeding upward. (In a way, this might be equivalent to starting a Basic program by writing all the subroutines, and gradually building up to bigger and bigger subroutines, until at the end we write one program which simply calls the subroutines under it.)

For initial testing purposes, the computer would be used with a terminal connected to its RS-232C port. Once the control program is debugged, it can be transferred from RAM into EPROM, and the EPROM added to the board. On power-up, the computer would then execute the program in the new EPROM, instead of accepting a program from the keyboard as usual. The final program, though, would still be in OFORTH format, and would be interpreted by the OFORTH language system. (This describes the way Datricon intends the unit to be programmed for process control; there is obviously no reason why a final program could not be done in machine language instead, but program development in OFORTH might be much simpler - once you learn OFORTH.)

All in all, Datricon's single-board computer and associated OFORTH language system is a novel and quite useful tool for the industrial computer user who needs a sophisticated control computer.

TRS80C HINTS

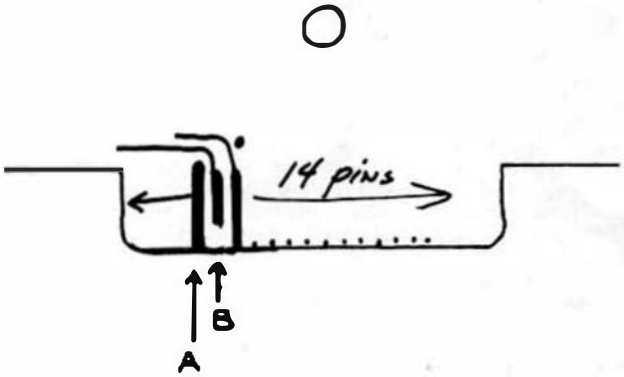
We have had numerous request for the information necessary to enable Radio Shack program paks for access.

By carefully removing the screw (under the label) binding the two halves of the plastic cartridge, remove the circuit board by lifting up and off the screw retainer post. Next cover the foil(A) which is to the right (boards right, your left) of the short foil(B). You will note that this foil connector has no connection on the board, it merely returns two pins on the main circuit board. Reassemble in reverse to the above.

When the TRS80C™ is turned on it will come up in BASIC, even though the game pak is installed in the side slot. To call the game pak type in the following:

EXEC 49152 C/R

This jumps to $C000 which is the hex for decimal 49152, this is the standard program entry point for all game paks we have tested. Reseting the machine jumps back to BASIC from where you may use one of the monitor programs available (such as CBUG from The MICRO WORKS) to do whatever you desire with the code in the game pak.



ADVENTURE

by
JACK DOREMUS

A REVIEW
by
PAUL E. PHELPS
111 DIVISION ST. 19
KING CITY, CALIF 93930

I have to begin by saying that I am a long time Adventure addict. It began some two years ago when I was assigned to my current Post in California. Since then, whenever I could find the time to use our DEC-10 and play Adventure, I have been up there fighting dwarves and hunting treasure. I should also add, being consntantly frustrated by not enough time to work on it seriously. Jack Doremus has solved that problem for me and for a lot of other people.

I heard through a friend that Jack Doremus of Wichita, Kansas had written an assembly language version of the game that, he claimed, was faithful to the original. Taking the dragon by the tail (we 'addicts are persistent, if naught else) I wrote to share my concern and my hope. He wrote back to say that, yes, indeed, he had written such a program, that it would be available for sale in January 1981 and there would be a ad in '68 MICRO JOURNAL. However, he also indicated he would be glad for a tester who ran a 6800 machine with an LFD-400 disk system....I almost beat down the post office trying to get my answer in the mail late Saturday night. In due time the disk arrived.

It came up and ran without a hitch. I was at last in the Colossal Cave on my home machine with all the time I could afford to spend searching, killing dwarves and generally trying to become an Adventurer

Grandmaster. I succeeded after several hours of effort carefully following maps made previously and every hint and help I could garner. I can say that it ran true in every detail I am aware of to the original game by Crowther and Woods.

The games resides in 35k of ram using locations from 0020H to 7FFFH and from A300-AC90H as well. It is available in both Percom LFD-400 disk format and Flex 2.0 as well. I can't speak for the Flex version, but the game is true to the original including the strings. Jack did not shorten any of the original location descriptions and, to my knowledge all of the various puzzels are intact. It retains all of the color and challenge. If fact, if you have a map of the original game, it will work with this one.

I can't recommend this game highly enough. It's like having the original game on an DEC-10 or an IBM 360 move in with you. The whole game resides in ram so there is no waiting for disk calls and it runs as fast as the ones on the bigger machines.

Adventure for the 6800 by Jack Doremus is available from Application Services Company, P.O. box 12227, Wichita, Kansas 67277 for $24.95 on the disk of your choice. But remember, this is not a run of the mill immitation... This is the original. Be prepared for long hours wandering through the cave, the frustration of failure and the glory of a win! Happy Adventuring.

Editor's note: The same 'ADVENTURE' is now available for the 6809, so no one gets left out.

PAYROLL

The following is published due to the growing interest in business type programs for the Standard S50 Bus. They run with TSC's XBASIC, which is now into version number 17. It is probably important when running software that involves money (yours) that you have the latest versions of software that determine the accuracy of your endevor. I recommend strongly that you contact the vendors of any 'important' software, from time to time, and determine their policy on up-dates and why you might need an up-date. Many times the versions of different types of software are up-dated for reason so obscure, inscrutable or insignificant as to not warrant any expense of keeping current. But at least you should find out.

* Information and prices for the TIME-COST study program can be secured from DigiTech Enterprises, Inc, 97 Main Street, Newton, NJ 07860, 201-383-8919. We have tested this software in our lab and feel that the same program is of value to lawyers, accountants and any other company or professional who deals with clients on an hourly basis. It is our understanding that the programs can be purchased in compiled or source form.

The PAYROLL program was originally published in the New Jersey Computer Club Newsletter, but not in the more complete form listed here. It can be purchased with up-dates and maintenance, from DigiTech for $59.95, either 8 or 5 inch disk (specify). For you fast fingered keyers - here is a nice one to type in. And for FREE! Thanks Wayne Leinen, and DigiTech.

CORRECTION NOTE: A late call by Wayne indicated that a couple of changes need to be made to the code to correct a possible error. Note programs "COPYDATA" change the variable PN to PD. For the program "DATABASE" change EOF to "" (double quotes - null) "PAYROLL" change the SS rate to the new rate (line 760) and change line 770 to 1975.05 which should be the maximum deduction. This should get you current for 1981 rates.

DMW

*** Time/Cost Study Program ***

DigiTech is pleased to announce a time/cost study program written with the legal profession in mind. It will allow the attorney to keep accurate records of time and costs on a case/client basis. A special flag option is included to alert the attorney when a preset (by the case) number of hours has been reached! this flag is presented during record entry. Reports can be generated at any time for any or all clients. These reports list the following! (see sample)

1. Date and page number of the report
2. Client name and address
3. Case numbers
4. Dates of entry
5. Type of service
6. Time
7. Costs
8. Check number
9. Record number and status (open, billed, paid)
10. Time/Cost subtotal by the case
11. Time/Cost totals

The program will allow (per each 8" Double Sided/Double Density floppy disk) a maximum of!

1. 150 clients
2. 10 cases per client
3. 200 open (unpaid) records per client

Clients and/or cases may be easily edited or deleted, and an automatic expansion to the maximum number of records is achieved by a DELETE PAID ITEM mode during report generation.

System requirements are!

1. A SWTP 6809 Computer system with 56K RAM
2. Dual 8" double sided/double density floppy drives
3. CT-82 Terminal
4. Flex 09 Operating system *
5. TSC Extended Basic
6. Printer with driver software

The program may be modified for any time/cost type study and source code is available with license agreement for SWTP dealers.

*** Time/Cost Study Program ***

OPERATION INSTRUCTIONS

page	description
4	Initialization of a data disk
4	Main menu
5	Building the client database
6	Editing the client database
6	Delete client
7	Delete case number
8	Change name, address, city state zip fields
8	Change case number and/or hours permitted
9	Change or reset max hours flag
10	Entering the billing records
12	Modify time records
13	Report generator and/or print client list
15	Sample Time/Cost summary

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DigiTech Enterprises, Inc.
Post Office Box 97 • Newton, New Jersey 07860 • 201-383-8919

*** Time/Cost Study Program ***

INITIALIZATION OF DATA DISK MODULE

In order to build the client database you must have a clean (new/blank) diskette! this diskette must first be initialized with blank record information. To initialize a diskette you must answer the prompt

TYPE '1' TO INITIALIZE A NEW DATA DISK, 'RETURN' FOR MENU

With '1' at this point program control is passed to an initialization program. This program is self prompting and displays the contents of the disks directory. The disk must have at least 2900 free sectors. The program will then ask you if you want to continue..... answer 'Y' to both prompts if you have 2900 sectors and want to initialize the disk in drive # 1. Control will then be passed back to the main program.

THE INITIALIZATION PROGRAM TAKES ABOUT 25 MINUTES TO RUN....
MAIN MENU

After the INITIALIZATION prompt is answered, you will be prompted

MENU

TYPE	'D'	TO BUILD CLIENT DATABASE
	'C'	TO CHANGE CLIENT DATABASE
	'R'	TO RECORD OR MODIFY TIME RECORDS
	'S'	TO PRINT CLIENT LIST OR TIME/COST SUMMARY
	'E'	TO END PROGRAM

PLEASE ENTER FUNCTION CODE

If you type 'D' proceed to page 5
'C' proceed to page 6
'R' proceed to page 10
'S' proceed to page 13

CLIENT DATABASE GENERATION

The client database consists of the following records:

1. Client name
2. Client street
3. Client city, state & zip
4. Case numbers (up to 10 for each client)
5. Hours permitted on each case

Entry to this module is made from the menu by entering a 'D' to the 'ENTER FUNCTION CODE' prompt. At this point the disk file is scanned for the next open client record (0 to 150) and you are prompted to

'ENTER THE CLIENTS NAME (LAST NAME FIRST); 'END' TO LEAVE THIS MODE'

If you desire to add a client at this point, ENTER the requested information; if not, ENTER 'END' for the name ('END' will bring you back to the master menu).

You will then be prompted to

'ENTER THE CLIENT'S STREET ADDRESS'

Enter the requested information, and you will be prompted

'ENTER THE CLIENTS CITY, STATE & ZIP'

Again enter the requested information.

At this point the program will branch to the CASE NUMBER record and allow you to enter up to 10 case numbers for the just entered client (just follow the on screen prompts)! If you have less than 10 cases, ENTER a '0' (zero) when finished.
The system will now clear the screen and display

RECORD # (0 to 150) CLIENT NAME (the name you just entered)

ENTER A '0' (zero) IF CLIENT IS TO HAVE UNLIMITED HOURS

CASE # (first case) ENTER THE MAX HOURS PERMITTED ?

ENTER the requested information, the next case number will now be displayed, and you will be requested to enter the hours for that case (this will continue for all case numbers entered).

When you have completed the last case, the screen will be erased, and all entered information will be displayed so that it can be checked for accuracy (if you made a mistake, you will have to enter the EDIT mode). Hit RETURN to process the next client.

EDITING THE CLIENT DATABASE

NOTE: YOU MAY ENTER THE RECORD # IN RESPONSE TO THE CLIENT NAME PROMPT IN ALL OF THE FOLLOWING MODULES (this will speed up any search times).

Entry to this module is made from the menu by entering a 'C' to the 'ENTER FUNCTION CODE' prompt. At this point the screen will display the sub menu

DATABASE EDIT MODULE

TYPE	'D'	TO DELETE A CLIENT OR CASE
	'C'	TO CHANGE OTHER INFORMATION
	'E'	TO RETURN TO THE MENU

PLEASE ENTER FUNCTION CODE

If you enter 'E' Proceed to page # 8
'D' you will be prompted

DELETE CLIENT OR CASE MODULE

TYPE	'E'	TO DELETE A CLIENT
	'C'	TO DELETE A CASE NUMBER

If you type 'N' Proceed to page # 7
'C' you will be prompted

ENTER CLIENT NAME (LAST NAME FIRST.. EXACT SPELLING)

You can then enter the name of the client or 'STOP' to return you to the menu. The computer will then do a client lookup and display

RECORD NUMBER	xxx
CLIENT NAME	name
CLIENT STREET	street
CLIENT CITY STATE	city state zip

IS THIS THE RECORD YOU WANT TO DELETE (Y or N)

If you answer 'N', the computer will continue searching for another client with the same spelling; if it can't find one, it will represent you for the name.. If you answered 'Y' to the prompt you will be prompted

ARE YOU SURE

If you answer 'Y' ALL RECORDS ASSOCIATED WITH THIS CLIENT WILL BE ERASED .....
If you answer 'N' you will be returned to the delete menu.

DELETE CASE NUMBER MODULE

If you type an 'N' you will be prompted

DELETE CASE NUMBER MODULE

TYPE	'D'	TO DELETE A CASE NUMBER
	'E'	TO RETURN TO MENU

PLEASE ENTER FUNCTION CODE

Enter a 'D' to continue, 'E' to return to the edit menu.
If you entered 'D' you will be prompted

ENTER CLIENT NAME (LAST NAME FIRST.. EXACT SPELLING)

You can then enter the name of the client or 'STOP' to return you to the menu. The computer will then do a client lookup and display

RECORD NUMBER	xxx
CLIENT NAME	name
CLIENT STREET	street
CLIENT CITY STATE	city state zip

Answer 'Y' if you want to delete a case from this record; 'N' if not (if you enter 'N', the computer will continue to scan for another name with the same spelling. If you have answered with a 'Y', the screen will display a list of VALID CASE NUMBERS) you will then have to enter the case number you want to delete. You will then be prompted CASE DELETED.... TYPE RETURN TO CONTINUE! Hit 'RETURN', and you will re-enter the delete case menu.

CHANGE OTHER INFORMATION MODULE

If you entered a 'C', you would be prompted

FILE EDIT MODULE

ENTER THE CLIENT NAME (LAST NAME FIRST... EXACT SPELLING)

Enter the desired client name ('STOP' to return to database edit menu)! the computer will scan for the client and display

CHANGE WHICH INFO.....

1. name
2. street
3. city state zip

ENTER THE # OF THE FIELD TO BE CHANGED (0 FOR NEXT GROUP 4 TO END MODE)

Enter the numbers 0 to 4 depending on the desired function.
1 to 3 will prompt you with

ENTER NAME CHANGE or
ENTER STREET CHANGE or
ENTER CITY, STATE ZIP CHANGE

Enter the correct information.

4 will return you to the database edit menu.
0 will prompt you with

RECORD NUMBER xxx CLIENT NAME name

0.	CASE NUMBER	xxxx	MAX HOURS PERMITTED xxx
1.	CASE NUMBER	xxxx	MAX HOURS PERMITTED xxx
2.	CASE NUMBER	xxxx	MAX HOURS PERMITTED xxx
3.	CASE NUMBER	xxxx	MAX HOURS PERMITTED xxx
4.	CASE NUMBER	xxxx	MAX HOURS PERMITTED xxx
5.	CASE NUMBER	xxxx	MAX HOURS PERMITTED xxx
6.	CASE NUMBER	xxxx	MAX HOURS PERMITTED xxx
7.	CASE NUMBER	xxxx	MAX HOURS PERMITTED xxx
8.	CASE NUMBER	xxxx	MAX HOURS PERMITTED xxx
9.	CASE NUMBER	xxxx	MAX HOURS PERMITTED xxx

ENTER THE # OF THE FIELD TO BE CHANGED (0 TO END MODE... 9 NEXT GROUP)

Enter the desired field (0 to 9 to end mode) (9 for next group...

If you entered a 0 to 9, you would be prompted

CURRENT CASE # xxxx ENTER NEW CASE # ?

Enter the new case number you will then be prompted

CURRENT MAX HRS xxx ENTER NEW MAX HRS ?
You will then be returned to a new display of case/hours; modify as above.

If you entered an 11, you will be prompted

RECORD # xxx	CLIENT NAME name	
CASE #	TOTAL HOURS	RECORD #
xxxx	xxxx	0
xxxx	xxxx	1
xxxx	xxxx	2
xxxx	xxxx	3
xxxx	xxxx	4
x	xxxx	5
xxxx	x	6
xxxx	xxx	7
xxxx	xxxx	8
xxxx	xxxx	9

CHANGE WHICH RECORD NUMBER (0 to 9... 10 TO END THIS MODE)

If you entered 0 to 9, you would be prompted

ENTER THE NEW TOTAL or '0' to RESET TOTAL

Enter the desired information, the computer will then display the case/total/record number.

TO RECORD OR MODIFY TIME RECORDS

If you entered an 'R', you would be prompted

TIMEKEEPING MODULE

PLEASE ENTER THE DATE (MMDDYY)

You must enter the date in the exact format (MMDDYY); six characters total. If you enter greater or less than 6 characters, you will be issued an error message and be re-prompted for the correct format.....

You will then be prompted

DATE MM/DD/YY

TYPE	'D'	TO CHANGE DATE
	'A'	TO ADD TIME OR COSTS TO CLIENT'S CASE
	'C'	TO END THIS MODULE
	'M'	TO MODIFY TIME OR COST RECORDS

ENTER THE FUNCTION CODE

If you enter 'E' you will return to the main menu
'D' you will be prompted for the date as above
'M' proceed to page 12
'A' you will be prompted

```
ENTER THE CLIENT NAME (LAST NAME FIRST... EXACT SPELLING)
```

Enter the client name, and the computer will do a lookup; it will then display

```
CLIENT NAME     name
RECORD #        xxx

IS THIS THE CLIENT YOU WISH  (Y or N)
```

Answer the prompt; if your answer was 'N', the computer will continue to search for another name with the same spelling.
If you answered 'Y', you would be displayed and prompted

```
RECORD #     xxx          CLIENT NAME   name

RECORD #          CASE #
0                 xxxx
1                 xxxx
2                 xxxx
3                 xxxx
4                 xxxx
5                 xxxx
6                 xxxx
7                 xxxx
8                 xxxx
9                 x  x
ENTER THE CASE RECORD NUMBER  (0-9)
```

Enter the correct number (0-9); the screen will be cleared, and you will prompted

```
RECORD # xxx   CLIENT NAME   name      CASE #  xxxx
TIME/COST RECORD # xxx


ENTER  'R' TO CONTINUE / 'D' TO CHANGE DATE / 'M' FOR MENU
       'C' TO CHANGE CASE # / 'N' TO CHANGE CLIENT NAME
```

If you enter 'D' you will be prompted for the new date and returned to the above prompt
'M' you will be returned to the menu
'C' you will be prompted for the new case # and returned to the above prompt
'N' you will be prompted for the client name as above
'R' you will be prompted

```
VALID SERVICE CODES ARE
A - COURT APPEARANCE            B - BRIEFING
C - CONFERENCE                  D - DICTATION
F - INVESTIGATION               P - PREPARATION
R - RESEARCH                    $ - PETTY CASH
T - TELEPHONE                   V - TRAVEL
O - OTHER
ENTER THE SERVICE CODE  (1 CHARACTER)
```

You will then be prompted

```
ENTER THE TIME  (0) IF NONE/ (H.T)/ (3 CHARACTERS)
```

Enter the information in the above format (H.T)

```
**********************************************************************************
IF THE ABOVE INPUT CAUSES THE TOTAL HOURS ON THE CASE TO EXCEED THE TOTAL
HOURS INDICATED IN THE FLAG FILE THE FOLLOWING MESSAGE WILL FLASH ON THE
SCREEN; 4 TIMES..............  AN AUDIBLE ALARM WILL SOUND EACH TIME.

      TOTAL TIME IS OVER THE PRESET LIMIT... REFER TO USER INSTRUCTIONS

  YOU MAY CHANGE THE MAX HOURS OR RESET THE NUMBER OF HOURS (See case/total
      hours section - change other information / DATABASE EDIT MODULE)
**********************************************************************************
```

You will now be prompted

```
ENTER THE COSTS (0) IF NONE; (DDD.CC)
```

Enter the costs (if any), and you will be prompted

```
ENTER THE CHECK NUMBER  (4 CHARACTERS)
```

Your record will now be written to disk, and you will be returned to the TIME/COST RECORD # prompt as above.
NOTE: If you did not enter costs, you will not be prompted for the check #.

TIMEKEEPING MODIFY MODULE

If you entered 'M', you would be prompted

```
TIMEKEEPING MODIFY MODULE
ENTER CLIENT NAME (LAST NAME FIRST  EXACT SPELLING) # 'E' TO END THIS MODE
```

Enter the client name, and you will be prompted

```
RECORD # xxx     CLIENT NAME   name

IS THIS THE CLIENT YOU WISH  (Y or N)
```

Again, if you enter 'N', a further search is made or else you will be prompted

```
RECORD # xxx     CLIENT NAME   name
```

STATUS	SERVICE	CASE #	DATE	TIME	COSTS	CHECK #	RECORD #
xxxx	x	xxxx	xx/xx/xx	x.x	xxx.xx	xxxx	xxx
xxxx	x	xxxx	xx/xx/xx	x.x	xxx.xx	xxxx	xxx
xxxx	x	xxxx	xx/xx/xx	x.x	xx .xx	xxxx	xxx
xxxx	x	xxxx	xx/xx/xx	x.x	xxx.xx	xxxx	xxx
xxxx	x	xxxx	xx/xx/xx	x.x	xxx.xx	xxxx	xxx
xxxx	x	xxxx	xx/xx/xx	x.x	xxx.xx	xxxx	xxx
xxxx	x	xxxx	xx/xx/xx	x.x	xxx.xx	xxxx	xxx
xxxx	x	xxxx	xx/xx/xx	x.x	xxx.xx	xxxx	xxx
xxxx	x	xxxx	xx/xx/xx	x.x	xxx.xx	xxxx	xxx
xxxx	x	xxxx	xx/xx/xx	x.x	xxx.xx	xxxx	xxx

```
TYPE 'RETURN' FOR NEXT SET / 'M' TO MODIFY / 'E' TO END
```

NOTE: Any or all of the above x's may be blank fields

If you enter 'RETURN' the next 10 records will be displayed
'E' you will be returned to the timekeeping module menu
'M' you will be prompted

```
DO NOT TRY TO CHANGE A 'FREE' RECORD
ENTER THE RECORD NUMBER TO BE MODIFIED  (0 to 200)
```

Enter the record number (from the 10 listed above), and you will be prompted

```
CHANGE THE RECORD TO  (O=OPEN / B=BILLED / P=PAID)
```

Enter one of the above codes (O,B,P), and the record will be updated. If you enter a 'RETURN', the whole record will be erased. The whole set will then be re-displayed, and you will be given the option to change other records.

NOTE: THE MAIN REASON FOR THIS MODULE IS TO FLAG RECORDS PAID SO THAT THEY MAY BE DELETED WHEN THE REPORT GENERATOR IS RUN........

*** Time/Cost Study Program ***

TIME / COST SUMMARY MODULE

If you had typed an 'S', you would be prompted

```
TYPE    'R' TO REVIEW CLIENT RECORDS
        'P' TO PRINT A CURRENT CLIENT LIST
        'E' TO END THIS MODULE
```

If you enter a 'P', your printer would print out a current list of clients. This list would include the:

1. Name
2. Street
3. City State & Zip
4. A listing of all active case numbers
5. Client record number

If you entered an 'R', you would be prompted

```
ENTER CLIENT NAME  (LAST NAME FIRST... EXACT SPELLING)
```

At this point you may want to print out summary sheets for all clients. If you do, ENTER 'ALL' to this prompt. If you want only one client, ENTER the name.

If you asked for one client, you would be prompted

```
IS THIS THE CLIENT YOU WISH  (Y or N)
```

If you enter a 'N' the computer will resume searching.
'Y' then you will be prompted

```
TYPE    'C' TO VIEW CASE TIME/COST TOTALS
        'P' TO PRINT OUT SUMMARY SHEET
        'E' TO END THIS MODULE
```

If you entered 'P' proceed to page 14
'C' you computer would display

```
ACCUMULATED TOTALS TO DATE
NAME     name     RECORD # xxx
```

CASE	TIME TOTAL	TOTAL COSTS	MAX HOURS PERM
xxxx	xxx.x	xxxx.xx	xxx.x
xxxx	xxx.x	xxxx.xx	xxx.x
xxxx	xxx.x	xxxx.xx	xxx.x
xxxx	xxx.x	xxxx.xx	xxx.x
xxxx	xxx.x	xxxx.xx	xxx.x
xxxx	xxx.x	xxxx.xx	xxx.x
xxxx	xxx.x	xxxx.xx	xxx.x
xxxx	xxx.x	xxxx.xx	xxx.x
xxxx	xxx.x	xxxx.xx	xxx.x
xxxx	xxx.x	xxxx.xx	xxx.x

```
HIT 'RETURN' FOR MENU
```

If you had entered 'ALL' in response to the CLIENT NAME prompt or 'P' to the above, you would be prompted

```
DO YOU WANT TO DELETE PAID RECORDS  (Y or N)
```

If you answer 'Y', you will be prompted

```
ARE YOU SURE
```

If you are sure, answer 'Y' and all paid records will be deleted (the records can not be retrieved once deleted).

Next you will be prompted

```
DO YOU WANT TO FLAG OPEN RECORDS BILLED (Y or N)
```

Enter a 'Y' if you want to FLAG them BILLED

Next you will be prompted

```
DO YOU WANT TO PRINT BILLED/PAID RECORDS  (Y or N)
```

Answer this prompt depending on your needs.

The computer will then print out the summary sheet(s) depending on the response to the above prompts. If you entered 'ALL', all your clients will be printed (you may then use these sheets for billing purposes).

After the printing is finished, you will be returned back to the menu.

SAMPLE TIME / COST SUMMARY

```
                    LAW OFFICES OF
                    YOUR FIRM HERE

                CLIENT TIME/COST SUMMARY
                       PAGE # 1
                   AS OF  01-DEC-80


?
CLIENT NAME
CLIENT STREET
CLIENT CITY, STATE ZIP
```

CASE #	DATE	SERVICE	TIME	COSTS	CHECK #	R	S
6084	10/06/80	RESEARCH	7.3			0	B
6084	10/11/80	COURT	1.5			1	B
6084	10/13/80	PETTY CASH		$ 75.00	2220	2	O
6084	11/01/80	CONFERENCE	.9			3	O
6084	11/02/80	COURT	5.5			10	O
TIME SUB-TOTAL ----------------->			15.2				
COST SUB-TOTAL --------------------->				$ 75.00			
1234	11/01/80	TELEPHONE	.1			4	O
1234	11/01/80	BRIEFING	.9			5	B
1234	11/02/80	INVESTIGATE	2.5			6	O
1234	11/03/80	DICTATAION	.5			7	P
1234	11/04/80	TELEPHONE	.2			8	O
1234	11/05/80	PETTY CASH		$ 25.00	2221	9	O
TIME SUB-TOTAL ----------------->			4.2				
COST SUB-TOTAL --------------------->				$ 25.00			
TIME TOTALS ---------------->			19.4				
COST TOTALS ------------------------>				$ 100.00			

PAYROLL FILE EDIT (C) 1980 WAYNE LEINEN   11-20-80   PAGE 1

```
10 A=PEEK(HEX("C100"))
20 IF A=55 THEN 30 ELSE CHAIN"0.MENU"
30 REM PP= # OF PERIODS
40 PP=52
50 DP$="#####.##   ####.##   #####.##   ####.##   ###.##   ####.##   ####.##   #####.##"
60 GOSUB 700
70 DIGITS 16
80 ON ERROR GOTO 100
90 GOTO 150
100 IF ERR <> 30 THEN ON ERROR GOTO 0
110 GOSUB 1050
120 PRINT"WRONG DATA TYPE..... PLEASE RETYPE"
130 PRINT
140 RESUME
150 REM COPYRIGHT (C) 1980 WAYNE LEINEN
160 OPEN "1.PDA" AS 1
170 OPEN "1.PD"  AS 2
180 OPEN "1.GP"  AS 3
190 OPEN "1.SS"  AS 4
200 OPEN "1.FW"  AS 5
210 OPEN "1.SW"  AS 6
220 OPEN "1.UN"  AS 7
230 OPEN "1.OT"  AS 8
240 OPEN "1.ED"  AS 9
250 DIM#1,PD$(100,3)=32
260 DIM#2,PD(100,14)
270 DIM#3,GP(100,PP)
280 DIM#4,SS(100,PP)
290 DIM#5,FW(100,PP)
300 DIM#6,SW(100,PP)
310 DIM#7,UN(100,PP)
320 DIM#8,OT(100,PP)
330 DIM#9,ED(100,PP)
340 GOSUB 700
350 PRINT"ENTER '0' TO END PROGRAM"
360 INPUT"ENTER THE EMPLOYEE NUMBER    ",E%
370 IF E%=0 THEN CLOSE 1,2,3,4,5,6,7,8,9
380 IF E%=0 THEN CHAIN"0.MENU"
390 INPUT"WHICH PERIOD  (ENTER '0' FOR YTD TOTALS)    ",W%
400 IF W%=0 THEN 900
410 PRINT"TYPE   (G)ROSS   (F)ICA   F(WIT   (S)WT   (U)NEMP   (E)XTRA   (O)THER"
420 PRINT"       (L)ISTING        (R)ESTART          (N)EXT PERIOD"
430 PRINT" WHICH CODE ";:AA$=INCH$(0)
440 PRINT
450 IF AA$="L" THEN GOTO 340
460 IF AA$="R" THEN GOTO 340
470 IF AA$="N" THAN GOSUB 700
480 IF AA$="N" THEN W%=W%+1
490 IF AA$="N" THEN 580
500 INPUT"CHANGE DOLLAR AMOUNT TO    ",CT
510 IF AA$="G" THEN GP(E%,W%)=CT
520 IF AA$="F" THEN SS(E%,W%)=CT
530 IF AA$="W" THEN FW(E%,W%)=CT
540 IF AA$="S" THEN SW(E%,W%)=CT
550 IF AA$="U" THEN UN(E%,W%)=CT
560 IF AA$="E" THEN ED(E%,W%)=CT
570 IF AA$="O" THEN OT(E%,W%)=CT
580 P6=GP(E%,W%)
590 P7=SS(E%,W%)
600 P8=FW(E%,W%)
610 P9=SW(E%,W%)
620 PA=UN(E%,W%)
630 PB=ED(E%,W%)
640 PC=OT(E%,W%)
650 PD=P6-(P7+P8+P9+PA+PB+PC)
660 GOSUB 700
670 GOSUB 840
680 GOTO 410
690 STOP
700 PRINT CHR$(27);CHR$(69);CHR$(13):RETURN
710 GOSUB 700
720 REM
730 IF W%=0 THEN 750
740 PRINT"PERIOD NUMBER        ";W%
750 PRINT
760 P6=PD(E%,6)
770 P7=PD(E%,7)
780 P8=PD(E%,8)
790 P9=PD(E%,9)
800 PA=PD(E%,10)
810 PB=PD(E%,11)
820 PC=PD(E%,12)
830 PD=PD(E%,13)
840 PRINT"   GROSS        FICA        FWT        SWT     UNEMP     EXTRA     OTHER       NET"
850 PRINT USING DP$,P6,P7,P8,P9,PA,PB,PC,PD
860 PRINT
870 PRINT "EMPLOYEE NAME ";PD$(E%,1);"NUMBER ";E%;" PERIOD #";W%
880 PRINT:PRINT:PRINT
890 RETURN
900 GOSUB 700
910 GOSUB 720
920 PRINT"TYPE    (G)ROSS   (F)ICA   F(WIT   (S)WT   (U)NEMP   (E)XTRA   (O)THER   (N)ET"
930 PRINT"         (R)ESTART"
940 PRINT"WHICH CODE ";:AA$=INCH$(0)
950 IF AA$="R" THEN 340
960 PRINT
970 INPUT"CHANGE DOLLAR AMOUNT TO    ",CT
980 IF AA$="G" THEN PD(E%,6)=CT
990 IF AA$="F" THEN PD(E%,7)=CT
1000 IF AA$="W" THEN PD(E%,8)=CT
1010 IF AA$="S" THEN PD(E%,9)=CT
1020 IF AA$="U" THEN PD(E%,10)=CT
1030 IF AA$="E" THEN PD(E%,11)=CT
1040 IF AA$="O" THEN PD(E%,12)=CT
1050 IF AA$="N" THEN PD(E%,13)=CT
1060 GOSUB 700
1070 GOTO 900
```

PAYROLL COPYDATA (C) 1980 WAYNE LEINEN   11-20-80   PAGE 1

```
10 ON ERROR GOTO 30
20 GOTO 100
30 IF ERR = 0 THEN 110
40 IF ERR = 30 THEN RESUME
50 IF ERR = 4 THEN 60 ELSE 100
60 GOSUB 1000
70 PRINT"DISK DRIVE # 1 DOES NOT CONTAIN THE PROPER DATA DISKETTE......"
80 PRINT"PLEASE CHECK AND REINSERT THE CORRECT DISKETTE... PRESS RETURN WHEN READY"
90 INPUT LINE AA$:GOSUB 1000:RESUME
100 ON ERROR GOTO 0
110 ER=ER + 1
120 IF ER =< 5 THEN RESUME
130 GOTO 100
140 PRINT
150 GOSUB 1000
160 PRINT "PAYROLL DATA RECORD COPY PROGRAM"
170 PRINT
180 PRINT "THIS PROGRAM WILL COPY THE ALPHA-NUMERIC AND STATUS INFO ON EACH"
190 PRINT "EMPLOYEE TO A NEW (NEWDISKED) DATA DISKETTE.......... IT IS TO BE"
200 PRINT "USED AT THE END OF EACH YEAR TO TRANSFER CURRENT EMPLOYEE DATA  "
210 PRINT "TO A FRESH DISK, DELETE TERMINATED EMPLOYEES AND ZERO OUT PAST"
220 PRINT "PAY DATA.......    PRESS RETURN WHEN READY TO PROCEED .........."
230 INPUT LINE AA$
240 GOSUB 1000
250 PRINT"PLEASE REMOVE YOUR 'PAYROLL' DISK FROM DRIVE NUMBER (LEFT SIDE) 0"
260 PRINT"AND PLACE A CLEAN (ONE THAT HAS BEEN NEWDISKED) DISKETTE INTO IT"
270 PRINT"(DRIVE # 0)...........     PRESS RETURN WHEN READY TO PROCEED ....."
280 INPUT LINE AA$
290 GOSUB 1000
300 PRINT"NEXT PLACE YOUR 'CURRENT PAYROLL DATA' DISKETTE INTO DRIVE (RIGHT SIDE)"
310 PRINT"1........    PRESS RETURN WHEN READY TO PROCEED ........................."
320 INPUT LINE AA$
330 GOSUB 1000
340 OPEN OLD "1.PDA" AS 1
350 OPEN OLD "1.PD" AS 2
360 DIM #1, PD$(100,3)=32
370 DIM #2, PD(100,14)
380 OPEN NEW "0.PDAN" AS 3
390 OPEN NEW "0.PDN" AS 4
400 DIM #3, PN$(100,3)=32
410 PN$(100,1)="EOF"
420    $(100,2)="EOF"
430 PN$(100,3)="EOF"
440 DIM #4, PN(100,14)
450 PN(100,1)=0
460 PN(100,2)=0
470 PN(100,3)=0
480 PN(100,4)=0
490 PN(100,5)=0
500 PN(100,14)=0
510 EN%=1
520 FOR E%=1 TO 100
530 IF PD(E%,3)=3 THEN NEXT E%
540 GOSUB 1000
550 PRINT "DRIVE #1 EMPLOYEE NUMBER   ";E%;"   TO DRIVE #0 EMPLOYEE NUMBER   ";EN%
560 PN$=PD$(E%,1)
570 PA$=PD$(E%,2)
580 PC$=PD$(E%,3)
590 P1=PN(E%,1)
600 P2=PN(E%,2)
610 P3=PN(E%,3)
620 P4=PN(E%,4)
630 P5=PN(E%,5)
640 P6=PN(E%,14)
650 PN$(EN%,1)=PN$
660 PN$(EN%,2)=PA$
670 PN$(EN%,3)=PC$
680 PN(EN%,1)=P1
690 PN(EN%,2)=P2
700 PN(EN%,3)=P3
710 PN(EN%,4)=P4
720 PN(EN%,5)=P5
730 PN(EN%,14)=P6
740 EN%=EN%+1
750 NEXT E%
760 CLOSE 1,2,3,4
770 RENAME "0.PDAN.DAT","0.PDA.DAT"
780 RENAME "0.PDN.DAT","0.PD.DAT"
790 GOSUB 1000
800 PRINT "PLEASE REMOVE THE DATA DISKETTE FROM DRIVE (RIGHT SIDE) #1 AND "
810 PRINT "ARCHIVE IT FOR SEVEN (7) YEARS..... PRESS RETURN WHEN DONE "
820 INPUT LINE AA$
830 GOSUB 1000
840 PRINT "REMOVE THE NEW DATA DISKETTE FROM DRIVE (LEFT SIDE) #0, AND PLACE"
850 PRINT "IT INTO DRIVE (RIGHT SIDE) #1..... PRESS RETURN WHEN DONE "
860 INPUT LINE AA$
870 GOSUB 1000
880 PRINT "PLEASE PLACE YOUR 'PROGRAM' DISK INTO DRIVE (LEFT SIDE) #0 AND"
890 PRINT "THE COMPUTER WILL NOW LOAD AND EXECUTE THE DATA BASE PROGRAM."
900 PRINT "TYPE 'D' WHEN ASKED WHICH FUNCTION.....  THE MENU WILL THEN BE"
910 PRINT "LOADED.......    TYPE 'E' TO END THE PROGRAM........ USE THE DATA"
920 PRINT "DISKETTE THAT IS IN DRIVE (RIGHT SIDE) #1 AS YOUR NEW PAYROLL DISK"
930 PRINT
940 PRINT "                       PRESS  RETURN  WHEN  READY"
950 INPUT LINE AA$
960 POKE HEX("C100"),55
970 CHAIN"0.DATABASE"
980 STOP
990 END
1000 PRINT CHR$(27);CHR$(69);CHR$(13)
1010 RETURN
```

PN → PD
Change

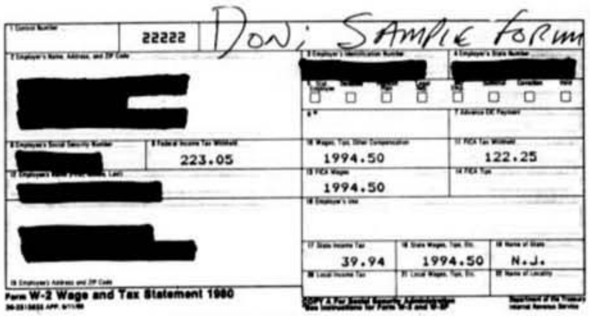
PAYROLL DATABASE (C) 1980 WAYNE LEINEN   11-20-80   PAGE 1

```
10 A=PEEK(HEX("C100"))
20 IF A=55 THEN 30 ELSE CHAIN"0.MENU"
30 DIGITS 11
40 PP=52:REM NUMBER OF PERIODS IN A YEAR
50 ON ERROR GOTO 70
60 GOTO 110
70 IF ERR <> 30 THEN ON ERROR GOTO 0
80 GOSUB 850
90 PRINT"NUMERIC FIELD ONLY..... PLEASE RETYPE"
100 PRINT
110 RESUME
120 REM COPYRIGHT (C) 1980 WAYNE LEINEN
130 REM PAYROLL PROGRAM
140 REM PD$(E,1) NAME
150 REM PD$(E,2) STREET
160 REM PD$(E,3) CITY, STATE  ZIP
170 REM PD(E,1) SS#
180 REM PD(E,2) # OF DEPS
190 REM PD(E,3) STATUS 1=SINGLE; 2=MARRIED; 3=TERMINATED
200 REM PD(E,4) PAY STATUS 1=HOURLY  2=SALARY
210 REM PD(E,5) EXTRA DEDUCTION AMT.
220 REM PD(E,6) GROSS  TD
230 REM PD(E,7) FICA  TD
240 REM PD(E,8) FWT   TD
250 REM PD(E,9) SWT   TD
260 REM PD(E,10) UNEMP  TD
270 REM PD(E,11) EXTRA  TD
280 REM PD(E,12) OTHER  TD
290 REM PD(E,13) NET    TD
300 REM PD(E,14) RATE OF PAY
310 REM GP(E,W) GROSS
320 REM SS(E,W) FICA
330 REM FW(E,W) FWT
340 REM SW(E,W) SWT
350 REM UN(E,W) UNEMP
360 REM ED(E,W) EXTRA DEDUCTION
370 REM OT(E,W) OTHER DEDUCTION
380 REM DT$(W)  DATE OF PAYROLL
390 GOSUB 850
400 PRINT"DATABASE SETUP    COPYRIGHT (C) 1980 WAYNE LEINEN"
410 PRINT"                  DigiTech Enterprises, Inc."
420 PRINT"                  Post Office Box 97"
430 PRINT"                  Newton, N.J.  07860"
440 PRINT"                  201-383-0019"
450 PRINT
460 OPEN "1.PDA"  AS 1
470 OPEN "1.PD"   AS 2
480 OPEN "1.GP"   AS 3
490 OPEN "1.SS"   AS 4
500 OPEN "1.FW"   AS 5
510 OPEN "1.SW"   AS 6
520 OPEN "1.UN"   AS 7
530 OPEN "1.OT"  AS 8
540 OPEN "1.ED"  AS 9
550 OPEN "1.PE" AS 10
560 OPEN "1.DT" AS 11
570 GOSUB 850
580 PRINT "DISK BEING INITIALIZED..... PLEASE STAND-BY"
590 DIM #1, PD$(100,3)=32
600 PD$(100,1)="EOF"
610 PD$(100,2)="EOF"
620 PD$(100,3)="EOF"
630 DIM #2, PD(100,14)
640 PD(100,14)=0.
650 DIM #3, GP(100,PP)
660 GP(100,PP)=0.
670 DIM #4, SS(100,PP)
680 SS(100,PP)=0.
690 DIM #5, FW(100,PP)
700 FW(100,PP)=0.
710 DIM #6, SW(100,PP)
720 SW(100,PP)=0.
730 DIM #7, UN(100,PP)
740 UN(100,PP)=0.
750 DIM #8, OT(100,PP)
760 OT(100,PP)=0.
770 DIM #9, ED(100,PP)
780 ED(100,PP)=0.
790 DIM #10,PE$(PP,1)=8
800 PE$(PP,1)=[illegible]
810 DIM #11, [illegible](PP)=9
820 DT$(PP)=[illegible]
830 GOTO 880
840 REM SUB TO CLEAR SCREEN
850 PRINT CHR$(27);CHR$(69)
860 PRINT CHR$(13)
870 RETURN
880 REM PROGRAM STARTS HERE
890 GOTO 920
900 CLOSE 1,2,3,4,5,6,7,8,9,10,11
910 CHAIN "0.MENU"
920 GOSUB 850
930 PRINT"TYPE A  (I) TO INITIALIZE THE DATA BASE"
940 PRINT"        (C) TO CHANGE OR REVIEW THE DATA BASE"
950 PRINT"        (E) TO END THE PROGRAM"
```

```
960 PRINT
970 PRINT"WHICH FUNCTION   ";:AN$=INCH$(0)
980 IF AN$="C" THEN 2340
990 IF AN$="D" THEN 1020
1000 IF AN$="E" THEN 980
1010 GOTO 920
1020 REM DATA BASE SETUP HERE
1030 GOTO 1060
1040 CLOSE 1,2,3,4,5,6,7,8,9,10,11
1050 GOTO 910
1060 FOR E%=1 TO 100
1070 IF LEFT$(PD$(E%,1),1)=CHR$(0) THEN 1100
1080 NEXT E%
1090 PRINT"DISK IS FULL (OVER 100 RECORDS)":GOTO 900
1100 GOSUB 850
1110 GOSUB 850
1120 PRINT"TYPE (STOP) FOR EMPLOYEE NAME TO STOP THIS MODE! (END) FOR LAST EMPLOYEE"
1130 PRINT"EMPLOYEE NUMBER ";E%
1140 PRINT"EMPLOYEE NAME ";:INPUT LINE NA$
1150 IF NA$="STOP" THEN 910
1160 IF NA$="END" THEN 2310
1170 PRINT"ADDRESS         ";:INPUT LINE AD$
1180 PRINT"CITY STATE ZIP";:INPUT LINE CT$
1190 PRINT"SS NUMBER 000000000   ";:INPUT P1
1200 PRINT"# OF DEDUCTIONS       ";:INPUT P2
1210 PRINT
1220 PRINT"STATUS  1=SINGLE      "
1230 PRINT"        2=MARRIED     "
1240 PRINT"        3=TERMINATED ";:INPUT P3
1250 PRINT
1260 PRINT"STATUS  1=HOURLY      "
1270 PRINT"        2=SALARY ";:INPUT P4
1280 PRINT
1290 PRINT"PAY RATE              ";:INPUT P6
1300 PRINT
1310 PRINT"EXTRA DEDUCTION AMT  ";:INPUT P5
1320 GOSUB 850
1330 PRINT"NAME                        ";NA$
1340 PRINT"STREET                      ";AD$
1350 PRINT"CITY, STATE  ZIP            ";CT$
1360 PRINT"SS NUMBER                   ";
1370 PRINT USING'###-##-####',P1
1380 PRINT"DEDUCTIONS                  ";P2
1390 PRINT"STATUS                      ";
1400 IF P3=1 THEN PRINT"SINGLE"
1410 IF P3=2 THEN PRINT"MARRIED"
1420 IF P3=3 THEN PRINT"TERMINATED"
1430 IF P4=1 THEN PRINT"HOURLY RATE OF              ";
1440 IF P4=2 THEN PRINT"SALARY OF                   ";
1450 PRINT USING'####.##',P6
1460 PRINT"EXTRA DED AMT          ";
1470 PRINT USING '####.##',P5
1480 PRINT"IS DATA OK  (Y OR N)    ";:AN$=INCH$(0)
1490 IF AN$="Y" THEN 1500 ELSE 1110
1500 PD$(E%,1)=NA$
1510 PD$(E%,2)=AD$
1520 PD$(E%,3)=CT$
1530 PD(E%,1)=P1
1540 PD(E%,2)=P2
1550 PD(E%,3)=P3
1560 PD(E%,4)=P4
1570 PD(E%,5)=P5
1580 PD(E%,14)=P6
1590 GOSUB 850
1600 FOR W%=1 TO PP
1610 PRINT"YOU WILL NOW ENTER THE PAYROLL RECORD TO DATE FOR THIS EMPLOYEE"
1620 PRINT"TYPE (99999) FOR THE GROSS PAY TO PROCEED TO THE NEXT EMPLOYEE...."
1630 PRINT"ENTER (0) FOR THE GROSS FOR EACH PERIOD THE EMPLOYEE DID NOT WORK "
1640 PRINT"YOU MUST COMPLETE THE PAY RECORD FOR THIS EMPLOYEE NOW"
1650 PRINT
1660 PRINT"EMPLOYEE NUMBER ";E%;"     NAME ";NA$;"     PERIOD NUMBER ";W%
1670 PRINT
1680 PA=0:PB=0:PC=0:PD=0:PE=0:PF=0:PG=0
1690 PRINT"ENTER THE GROSS PAY           ";:INPUT PA
1700 IF PA=0. THEN 1790
1710 IF PA=99999 THEN 2110
1720 PRINT"ENTER THE FICA WITHHELD       ";:INPUT PB
1730 PRINT"ENTER THE FWT WITHHELD        ";:INPUT PC
1740 PRINT"ENTER THE UNEMP TAX WITHHELD ";:INPUT PE
1750 PRINT"ENTER THE SWT WITHHELD        ";:INPUT PD
1760 PRINT"ENTER THE EXTRA DEDUCTION AMT";:INPUT PF
1770 PRINT"ENTER THE OTHER DEDUCTION AMT";:INPUT PG
1780 GOTO 1810
1790 PA=0:PB=0:PC=0:PD=0:PE=0:PF=0:PG=0:REM RESET VARIABLES
1800 GOTO 1940
1810 GOSUB 850
1820 PRINT"GROSS PAY                  ";:PRINT USING'#####.##',PA
1830 PRINT"FICA                       ";:PRINT USING'#####.##',PB
1840 PRINT"FWT                        ";:PRINT USING'#####.##',PC
1850 PRINT"SWT                        ";:PRINT USING'#####.##',PD
1860 PRINT"UNEMPLOYMENT TAX           ";:PRINT USING'#####.##',PE
1870 PRINT"EXTRA DEDUCTION            ";:PRINT USING'#####.##',PF
1880 PRINT"OTHER DEDUCTION            ";:PRINT USING'#####.##',PG
1890 PRINT
1900 PRINT"IS DATA OK  (Y OR N)    ";:AN$=INCH$(0)
1910 IF AN$="Y" THEN 1940
1920 GOSUB 850
1930 GOTO 1610
1940 GP(E%,W%)=PA
1950 SS(E%,W%)=PB
1960 FW(E%,W%)=PC
1970 SW(E%,W%)=PD
1980 UE(E%,W%)=PE
1990 ED(E%,W%)=PF
2000 OT(E%,W%)=PG
2010 S0=S0+PA
2020 S1=S1+PB
2030 S2=S2+PC
2040 S3=S3+PD
2050 S4=S4+PE
2060 S5=S5+PF
2070 S6=S6+PG
2080 S7=S7+(PA-(PB+PC+PD+PE+PF+PG))
2090 GOSUB 850
2100 NEXT W%
2110 PD(E%,6)=S0
2120 PD(E%,7)=S1
2130 PD(E%,8)=S2
2140 PD(E%,9)=S3
2150 PD(E%,10)=S4
2160 PD(E%,11)=S5
2170 PD(E%,12)=S6
2180 PD(E%,13)=S7
2190 S0=0:S1=0:S2=0:S3=0:S4=0:S5=0:S6=0:S7=0
2200 GOTO 1060
2210 FOR W%=1 TO PP
2220 GOSUB 850
2230 PRINT "PERIOD NUMBER ";W%
2240 PRINT"TYPE 'EOF' FOR  PERIOD AFTER LAST ONE PAID  "
2250 PRINT"PLEASE ENTER THE CHECK DATE FOR THE ABOVE PERIOD (DD-MMM-YY) ";:INPUT CD$
2260 IF CD$="EOF" THEN 2310
2270 PRINT"ENTER THE WEEK ENDING DATE FOR THE SAME PERIOD    (DD-MMM-YY)  ";:INPUT WE$
2280 PE$(W%,1)=WE$
2290 CT$(W%)=CD$
2300 NEXT W%
2310 GOSUB 850
2320 PRINT"*****  END OF DATA BASE SETUP *****"
2330 GOTO 910
2340 REM
2350 REM START OF DATA BASE CHANGE SUB
2360 GOSUB 850
2370 PRINT"THIS SUB PROGRAM WILL ALLOW YOU TO CHANGE THE DATA BASE FOR ANY OF"
2380 PRINT"YOUR EMPLOYEE'S.... YOU MAY REQUEST A FILE LISTING OF ALL DATA ON"
2390 PRINT"THAT EMPLOYEE AND YOU MAY CHANGE ANY OF THE DATA LISTED WITH HIM"
2400 PRINT
2410 E=0
2420 PRINT
2430 PRINT"TYPE    (R) FOR A COMPLETE REPORT"
2440 PRINT"        (L) FOR AN EMPLOYEES LISTING"
2450 PRINT"        (N) TO CHANGE EMPLOYEE NAME"
2460 PRINT"        (A) TO CHANGE EMPLOYEE STREET ADDRESS"
2470 PRINT"        (C) TO CHANGE EMPLOYEE CITY, STATE  ZIP"
2480 PRINT"        (S) TO CHANGE EMPLOYEE SOCIAL SECURITY NUMBER"
2490 PRINT"        (D) TO CHANGE THE NUMBER OF DEPENDENTS"
2500 PRINT"        (P) TO CHANGE THE PAY STATUS (HOURLY OR SALARY)"
2510 PRINT"        (G) TO CHANGE THE PAY RATE"
2520 PRINT"        (M) TO CHANGE THE STATUS (SINGLE, MARRIED, TERMINATED)"
2530 PRINT"        (E) TO CHANGE THE EXTRA DEDUCTION AMOUNT"
2540 PRINT"        (F) TO END THIS PROGRAM MODE"
2550 PRINT
2560 PRINT"WHICH FUNCTION   ";:AN$=INCH$(0)
2570 PRINT
2580 IF AN$="L" THEN 3710
2590 IF AN$="F" THEN 920
2600 INPUT"WHAT IS THE EMPLOYEE NUMBER  1-100",E
2610 IF AN$="R" THEN 2750
2620 IF AN$="N" THEN 3300
2630 IF AN$="A" THEN 3350
2640 IF AN$="C" THEN 3400
2650 IF AN$="S" THEN 3450
2660 IF AN$="D" THEN 3490
2670 IF AN$="P" THEN 3530
2680 IF AN$="M" THEN 3580
2690 IF AN$="E" THEN 3630
2700 IF AN$="G" THEN 3670
2710 GOSUB 850
2720 PRINT"INPUT ERROR.... PLEASE RETYPE THE CODE"
2730 GOTO 2360
2740 PRINT
2750 PRINT"DO YOU WANT A PRINTED COPY  (Y OR N)    ";:PR$=INCH$(0)
2760 PRINT
2770 IF PR$="Y" THEN 2790
2780 GOSUB 850
2790 IF PR$="Y" THEN OPEN "0.SERIAL.SYS" AS P
2800 D0$=PD$(E,1)
2810 IF LEFT$(D0$,1)=CHR$(0) THEN 3260
2820 D1$=PD$(E,2)
2830 D2$=PD$(E,3)
2840 D1=PD(E,1)
2850 D2=PD(E,2)
2860 D3=PD(E,3)
2870 D4=PD(E,4)
2880 D5=PD(E,5)
2890 D6=PD(E,6)
2900 D7=PD(E,7)
2910 D8=PD(E,8)
2920 D9=PD(E,9)
2930 DA=PD(E,10)
2940 DB=PD(E,11)
2950 DC=PD(E,12)
2960 DD=PD(E,13)
2970 DE=PD(E,14)
2980 PRINT#0,"EMPLOYEE NUMBER             ",E
2990 PRINT#0,"EMPLOYEE NAME               ",D0$
3000 PRINT#0,"STREET ADDRESS              ",D1$
3010 PRINT#0,"CITY, STATE  ZIP            ",D2$
3020 PRINT#0,"SOCIAL SECURITY NUMBER      ";:PRINT#0,USING'###-##-####',D1
3030 PRINT#0,"NUMBER OF DEPENDENTS        ",D2
3040 PRINT#0,"STATUS                      ",
3050 IF D3=1 THEN PRINT#0,"SINGLE";
3060 IF D3=2 THEN PRINT#0,"MARRIED";
3070 IF D3=3 THEN PRINT#0,"TERMINATED";
3080 PRINT#0
3090 PRINT#0,"PAY STATUS                  ",
3100 IF D4=1 THEN PRINT#0,USING'HOURLY RATE OF   ###.## ',DE
3110 IF D4=2 THEN PRINT#0,USING'SALARY OF   ####.##',DE
3120 PRINT#0,"EXTRA DEDUCTION AMT.        ";:PRINT#0,USING'#####.##',D5
3130 E
3140 IF LEFT$(PR$,1)="Y" THEN 3150 ELSE 3200
3150 PRINT#0
3160 PRINT#0,"GROSS PAY TO DATE           ";:PRINT#0,USING'#####.##',D6
3170 PRINT#0,"FICA TO DATE                ";:PRINT#0,USING'#####.##',D7
3180 PRINT#0,"FWT TO DATE                 ";:PRINT#0,USING'#####.##',D8
3190 PRINT#0,"SWT TO DATE                 ";:PRINT#0,USING'#####.##',D9
3200 PRINT#0,"UNEMPLOYMENT TAX TO DATE    ";:PRINT#0,USING'#####.##',DA
3210 PRINT#0,"EXTRA DEDUCTION TO DATE     ";:PRINT#0,USING'#####.##',DB
3220 PRINT#0,"OTHER DEDUCTION TO DATE     ";:PRINT#0,USING'#####.##',DC
3230 PRINT#0,"NET TO DATE                 ";:PRINT#0,USING'#####.##',DD
3240 PRINT#0:PRINT#0
3250 IF AA$="Y" THEN 3940
3260 CLOSE 0
3270 PRINT
3280 PRINT"HIT RETURN TO RESTART";:INPUT LINE AT$
3290 GOTO 2350
3300 GOSUB 850
3310 PRINT"NAME ON FILE   ";PD$(E,1)
3320 PRINT
3330 PRINT"ENTER THE NEW NAME   ";:INPUT LINE D0$:PD$(E,1)=D0$
3340 GOTO 2350
3350 GOSUB 850
3360 PRINT"ADDRESS ON FILE   ";PD$(E,2)
3370 PRINT
3380 PRINT"ENTER THE NEW ADDRESS   ";:INPUT LINE D1$:PD$(E,2)=D1$
3390 GOTO 2350
3400 GOSUB 850
3410 PRINT"CITY, STATE  ZIP  ON FILE   ";PD$(E,3)
3420 PRINT
3430 PRINT"ENTER THE NEW  CITY, STATE & ZIP   ";:INPUT LINE D2$:PD$(E,3)=D2$
3440 GOTO 2350
3450 GOSUB 850
3460 PRINT"SS # ON FILE   ";:PRINT USING '###-##-####',PD(E,1):PRINT
3470 PRINT"ENTER THE NEW SS #  (000000000)    ";:INPUT D1:PD(E,1)=D1
3480 GOTO 2350
3490 GOSUB 850
3500 PRINT"NUMBER OF DEPENDENTS ON FILE   ";PD(E,2)
3510 PRINT"ENTER THE NEW NUMBER OF DEPENDENTS   ";:INPUT D2:PD(E,2)=D2
3520 GOTO 2350
3530 GOSUB 850
3540 PRINT"PAY PERIOD CODE ON FILE (1-WEEKLY  2-MONTHLY)   ";PD(E,4)
3550 PRINT
3560 PRINT"ENTER THE NEW CODE AS ABOVE   ";:INPUT D4:PD(E,4)=D4
3570 GOTO 2350
3580 GOSUB 850
3590 PRINT"THE STATUS CODE ON FILE IS (1=SINGLE  2=MARRIED  3=TERMINATED)   ";PD(E,3)
3600 PRINT
3610 PRINT"ENTER THE NEW STATUS CODE AS ABOVE   ";:INPUT D3:PD(E,3)=D3
3620 GOTO 2350
3630 GOSUB 850
3640 PRINT"THE EXTRA DEDUCTION AMOUNT IS   ";PD(E,5):PRINT
3650 PRINT"ENTER THE NEW EXTRA DEDUCTION AMOUNT   ";:INPUT D5:PD(E,5)=D5
3660 GOTO 2350
3670 GOSUB 850
3680 PRINT"THE RATE OF PAY IS ";PD(E,14):PRINT
3690 PRINT"ENTER THE NEW RATE OF PAY ";:INPUT D6:PD(E,14)=D6
3700 GOTO 2350
3710 GOSUB 850
3720 GOSUB 3860
3730 PRINT
3740 N$=PD$(E,1)
3750 NN$=PD$(E+1,1)
3760 PRINT E;"   ";N$;TAB(40);(E+1);"   ";NN$
3770 E=E+2
3780 IF LEFT$(PD$(E,1),1)=CHR$(0) THEN 3880
3790 IF E=30 THEN 3820 ELSE 3800
3800 IF E=60 THEN 3820 ELSE 3810
3810 IF E=90 THEN 3820 ELSE 3850
3820 PRINT"HIT RETURN TO VIEW NEXT SET OF RECORDS";:INPUT LINE AN$
3830 GOSUB 850
3840 GOSUB 3860
3850 GOTO 3740
3860 PRINT" #     NAME";TAB(40);" #     NAME"
3870 RETURN
3880 PRINT"HIT RETURN TO RETURN TO MENU ";:INPUT LINE AN$
3890 GOTO 2360
3900 PRINT"DO YOU WANT TO LIST ALL THE EMPLOYEES  (Y OR N)    ";:AA$=INCH$(0)
3910 IF AA$="N" THEN 2780
3920 FOR E=1 TO 100
3930 GOTO 2790
3940 IF E/3=INT(E/3) THEN 3950 ELSE 3960
3950 PRINT#0,CHR$(12)
3960 NEXT E
```

```
1 REM  W2 FORM GENERATOR PROGRAM
10 DIGITS 13
20 REM COPYRIGHT 1981 Wayne V. [illegible]
30 GOTO 90
40 PRINT CHR$(27);CHR$(69);CHR$(12)
50 RETURN
```

```
60 ON ERROR GOTO 80
70 GOTO 120
80 IF ERR = 9 THEN 90 ELSE ON ERROR GOTO 0
90 EC=EC+1
100 IF EC>15 THEN ON ERROR GOTO 0
110 RESUME
120 GOSUB 40
130 OPEN "1.POA" AS 1
140 OPEN "1.PO" AS 2
150 DIM #1, PO$(100,3)=32
160 DIM #2, PO(100,16)
170 DF$='######.##'
180 DT$='#######.##'
190 PRINT"ENTER COMPANY NAME  ";:INPUT LINE CN$
200 PRINT"ENTER COMPANY STREET  ";:INPUT LINE CS$
210 PRINT"ENTER COMPANY CITY, STATE & ZIP  ";:INPUT LINE CC$
220 PRINT"ENTER COMPANY FEDERAL EMPLOYMENT NUMBER  ";:INPUT LINE CF$
230 GOSUB 40
240 PRINT"INSERT W2 FORMS INTO PRINTER AND LINE THEM UP AT THE FIRST PRINTING POSITION"
250 PRINT"PRESS 'RETURN' WHEN READY ";:AN$=INCH$(0)
260 OPEN "SERIAL.SYS.0" AS 0
270 FOR E%=1 TO 100
280 IF LEFT$(PO$(E%,1),1)=CHR$(0) THEN 750
290 IF PO(E%,3)=0 THEN 750
300 LC=LC+1:IF LC/42=INT(LC/42) THEN GOSUB 780
310 PRINT#0:PRINT#0
320 PRINT#0,TAB(35);CF$;TAB(52);CF$
330 PRINT#0,TAB(3);
340 PRINT#0,CN$
350 PRINT#0,TAB(3);
360 PRINT#0,CS$
370 PRINT#0,TAB(3);
380 PRINT#0,CC$
390 PRINT#0:PRINT#0
400 SS=PO(E%,1)
410 PRINT#0,TAB(3);
420 PRINT#0,USING '#########';SS;
430 PRINT#0,TAB(18);
440 F1=PO(E%,6)
450 F2=PO(E%,11)
460 F3=F1-F2
470 PRINT#0,USING DF$,F3;
480 PRINT#0,TAB(33);
490 PRINT#0,USING DF$,PO(E%,6);
500 PRINT#0,TAB(52);
510 PRINT#0,USING DF$,PO(E%,7)
520 PRINT#0
530 PRINT#0,TAB(3);
540 PRINT#0,PO$(E%,1);
550 PRINT#0,TAB(33);
560 PRINT#0,USING DF$,PO(E%,6)
570 PRINT#0:PRINT#0
580 PRINT#0,TAB(3);
590 PRINT#0,PO$(E%,2)
600 PRINT#0,TAB(3);
610 PRINT#0,PO$(E%,3)
620 PRINT#0,TAB(35);
630 PRINT#0,USING DF$,PO(E%,9);
640 PRINT#0,TAB(48);
650 PRINT#0,USING DF$,PO(E%,6);
660 PRINT#0,TAB(56);"  N.J."
670 F1=F1+F3
680 CR=CR+PO(E%,6)
690 F3=F3+PO(E%,7)
700 ST=ST+PO(E%,9)
710 Z1=6
720 FOR X%=1 TO Z1
730 PRINT#0
740 NEXT X%
750 NEXT E%
760 GOSUB 780
770 CLOSE 0,1,2:END
780 PRINT#0:PRINT#0
790 PRINT#0,TAB(35);CF$
800 PRINT#0,TAB(3);
810 PRINT#0,CN$
820 PRINT#0,TAB(3);
830 PRINT#0,CS$;
840 PRINT#0,TAB(55);"X"
850 PRINT#0,TAB(3);
860 PRINT#0,CC$
870 PRINT#0:PRINT#0
880 PRINT#0,TAB(18);
890 PRINT#0,USING DT$,FT;
900 PRINT#0,TAB(33);
910 PRINT#0,USING DT$,GR;
920 PRINT#0,TAB(52);
930 PRINT#0,USING DT$,FI
940 PRINT#0
950 PRINT#0,TAB(35);
960 PRINT#0,USING DT$,CR
970 X1=4
980 FOR I=1 TO X1:PRINT#0:NEXT I
990 PRINT#0,TAB(33);
1000 PRINT#0,USING DT$,ST;
1010 PRINT#0,TAB(44);
1020 PRINT#0,USING DT$,CR;
1030 PRINT#0,TAB(56);"  N.J."
1040 X1=6
1050 FOR X=1 TO X1:PRINT#0:NEXT X
1060 RETURN
```



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PAYROLL PROGRAM (C) 1980 WAYNE LEINEN 11-20-80 PAGE 1

```
10 CP$="  00   09   ####.##  ####.##   ####.##'
20 X=PEEK(HEX("C100"))
30 IF X=35 THEN 40 ELSE CHAIN "0.MENU"
40 PP=52:REM # OF PERIODS PER YR
50 OPEN"0.SERIAL.SYS"AS 0
60 GOTO 90
70 PRINT #0,CP$(1)7
80 GOTO 2590
90 DIGITS 16
100 ON ERROR GOTO 120
110 GOTO 210
120 IF ERR = 24 THEN PRINT"OUT OF DISK FILE SPACE  ":GOTO 3160
130 ER=ER+1
140 IF ER>15 THEN 2600
150 IF ERR = 9 THEN RESUME
160 IF ERR <> 30 THEN ON ERROR GOTO 0
170 GOSUB 660
180 PRINT"DATA TYPE ERROR..... PLEASE RETYPE"
190 PRINT
200 RESUME
210 REM COPYRIGHT (C) 1980 WAYNE LEINEN
220 REM PAYROLL PROGRAM
230 GOSUB 660
240 PRINT"PAYROLL PROGRAM   COPYRIGHT (C) 1980 WAYNE LEINEN"
250 PRINT"                  DigiTech Enterprises, Inc."
260 PRINT"                  Post Office Box 97"
270 PRINT"                  Newton, N.J.  07860"
280 PRINT"                  201-383-8919"
290 PRINT
300 OPEN "1.POA" AS 1
310 OPEN "1.PO"  AS 2
320 OPEN "1.GP"  AS 3
330 OPEN "1.SS"  AS 4
340 OPEN "1.FW"  AS 5
350 OPEN "1.SW"  AS 6
360 OPEN "1.UN"  AS 7
370 OPEN "1.OT"  AS 8
380 OPEN "1.ED"  AS 9
390 OPEN "1.PE"  AS 10
400 OPEN "1.DT"  AS 11
410 PRINT
420 PRINT "DISK BEING INITIALIZED..... PLEASE STAND-BY"
430 DIM #1, PO$(100,3)=32
440 DIM #2, PO(100,16)
450 DIM #3, GP(100,PP)
460 DIM #4, SS(100,PP)
470 DIM #5, FW(100,PP)
480 DIM #6, SW(100,PP)
490 DIM #7, UN(100,PP)
500 DIM #8, OT(100,PP)
510 DIM #9, ED(100,PP)
520 DIM #10,PE$(PP,1)=9
530 DIM GS(100)
540 DIM ZZ(100)
550 DIM RR(100)
560 DIM OV(100)
570 DIM RO(100)
580 DIM RT(100)
590 DIM FI(100)
600 DIM SA(100)
610 DIM SY(100)
620 DIM OR(100)
630 DIM #11, DT$(PP)=9
640 GOTO 720
650 REM SUB TO CLEAR SCREEN
660 PRINT CHR$(27);CHR$(88)
670 PRINT CHR$(32)
680 RETURN
690 REM SUB FOR ROUND-OFF TO NEAT CENT AFTER A PERCENT OPERATION
700 DT=100*(D0+.005):ET=INT(DT):D0=ET/100:RETURN
710 REM DT$ OF AS TO-FROM SUB
720 REM PROGRAM STARTS HERE
730 REM STATE ALLOWANCE FOR PERIOD
740 W1=1000
750 REM SS RATE AND MAX
760 ST=.0613
770 SL=1502.47
780 REM UNEMP RATE AND MAX
790 O1=.01
800 O2=00.00
810 REM FEDERAL ALLOWANCE FOR PERIOD
820 F1=1000
830 GOTO 1090
840 REM G=GROSS PAY FOR PERIOD: FT=FEDERAL WITHHOLDING FOR PERIOD
850 REM FEDERAL TAX LOOKUP FOR ANNUAL AND SINGLE STARTS HERE
860 IF G <= 1420. THEN FT=0.
870 IF G > 1420. AND G <= 3300. THEN FT= .15 *(G-1420.)
880 IF G > 3300. AND G <= 6800. THEN FT= 282. + (.18 *(G-3300.))
890 IF G > 6800. AND G <= 10200. THEN FT= 912. + (.21*(G-6800.))
900 IF G > 10200. AND G <= 14200. THEN FT= 1626. + (.26*(G-10200.))
910 IF G > 14200. AND G <= 17200. THEN FT= 2666. + (.30*(G-14200.))
920 IF G > 17200. AND G <= 22500. THEN FT= 3566. + (.34*(G-17200.))
930 IF G > 22500. THEN FT= 5368. + (.39*(G-22500.))
940 RETURN
950 REM FEDERAL TAX LOOKUP FOR ANNUAL AND MARRIED STARTS HERE
960 IF G <= 2400. THEN FT=0.
970 IF G > 2400. AND G <= 6600. THEN FT= .15 *(G-2400.)
980 IF G > 6600. AND G <= 10900. THEN FT= 630. + (.18*(G-6600.))
990 IF G > 10900. AND G <= 15000. THEN FT= 1404. + (.21*(G-10900.))
1000 IF G > 15000. AND G <= 19200. THEN FT= 2265. + (.24*(G-15000.))
1010 IF G > 19200. AND G <= 23600. THEN FT= 3273. + (.28*(G-19200.))
1020 IF G > 23600. AND G <= 28900. THEN FT= 4505. + (.32*(G-23600.))
1030 IF G > 28900. THEN FT= 6201. + (.37*(G-28900.))
1040 RETURN
1050 REM STATE TAX LOOKUP FOR ANNUAL STARTS HERE
1060 IF G <= 20000. THEN ST= .022*G
1070 IF G > 20000. THEN ST= 440. + (.025*(G-20000.))
1080 RETURN
1090 GOTO 1110
1100 CLOSE 1,2,3,4,5,6,7,8,9,10,11
1110 CLOSE 0:CHAIN "0.MENU"
1120 FOR WK=1 TO PP
1130 IF LEFT$(DT$(WK),1)=CHR$(0) THEN 1220
1140 NEXT WK
1150 GOSUB 650
1160 PRINT"THE PAYROLL DATA DISK HAS 52 PERIODS OF DATA RECORDED ........"
1170 PRINT"52 IS THE MAX. NUMBER OF PERIODS ALLOWED IN ONE YEAR .........."
1180 PRINT"PLEASE RUN THE DATABASE PROGRAM ON A NEW DISK AND COPY THE ALPHA-"
1190 PRINT"NUMERIC FILES TO IT....."
1200 FOR TX=1 TO 3500:A=A+TX:NEXT TX
1210 GOTO 1100
1220 REM PE$=PERIOD ENDING DATE  DW$ PAYROLL DATE
1230 INPUT"INPUT PERIOD ENDING DATE (DD-MMM-YY) FOR THE PAYROLL ";DT$
1240 PE$(WK,1)=DT$
1250 DW$=DT$
1260 GOSUB 650
1270 FOR E%=1 TO 100
1280 IF PO(E%,3)=3 THEN NEXT E%
1290 IF LEFT$(PO$(E%,1),1)=CHR$(0) THEN 1620:REM LOOK FOR EOF THEN PRINT TOTALS
1300 GOSUB 660
1310 PRINT"NAME  ";PO$(E%,1);"NUMBER  ";E%;"  PERIOD #  ";WK;"  ";DATE$
1320 IF PO(E%,4)=3 THEN 1330 ELSE 1360
1330 GS(E%)=PO(E%,10)
1340 PRINT"SALARY EMPLOYEE......"
1350 GOTO 1530
1360 PRINT
1370 PRINT"ENTER THE NUMBER OF REGULAR HOURS FOR THIS PERIOD  ";:INPUT RR(E%)
1380 PRINT"ENTER THE NUMBER OF OVERTIME HOURS FOR THIS PERIOD  ";:INPUT OV(E%)
1390 PRINT
1400 PRINT"THE NUMBER OF REGULAR HOURS WORKED ARE  ";RR(E%)
1410 PRINT"THE NUMBER OF OVERTIME HOURS WORKED ARE  ";OV(E%)
1420 PRINT
1430 PRINT"IS THE DATA CORRECT (Y OR N)  ";:AN$=INCH$(0)
1440 IF AN$="Y" THEN 1450 ELSE 1300
1450 IF RR(E%)<=0 THEN 1610
1460 RT(E%)=(RR(E%)*(PO(E%,10)))
1470 D0=RT(E%):GOSUB 690:RT(E%)=D0
1480 RO(E%)=(OV(E%)*(1.5)*(PO(E%,10)))
1490 D0=RO(E%):GOSUB 690:RO(E%)=D0
1500 D0=RT(E%)+RO(E%)
1510 GOSUB 690
1520 GS(E%)=D0
1530 PRINT
```

```
1540 PRINT
1550 PRINT"ENTER THE EXTRA DEDUCTION AMOUNT FOR THIS PERIOD (0 IF NONE)  ";
1560 ES(ES)=0:INPUT ES(ES)
1570 IF ES(ES)>(.5*GS(ES))THEN 1580 ELSE 1610
1580 GOSUB 660
1590 PRINT"EXTRA DEDUCTION AMOUNT IS GREATER THAN 50% OF GROSS.... RE-ENTER"
1600 GOTO 1550
1610 NEXT ES
1620 DTS(WS)=DATES

1630 FOR ES=1 TO 100
1640 IF LEFTS(PDS(ES,1),1)=CHRS(0) THEN 70:REM CHECK FOR EOF
1650 IF PD(ES,3)=3 THEN NEXT ES
1660 GT=GS(ES)
1670 IF GT=0 THEN 2540
1680 D1S=PDS(ES,1)
1690 D2S=PDS(ES,2)
1700 D3S=PDS(ES,3)
1710 D1=PD(ES,1)
1720 D2=PD(ES,2)
1730 D3=PD(ES,3)
1740 D4=PD(ES,4)
1750 D5=PD(ES,5)
1760 D6=PD(ES,6)
1770 D7=PD(ES,7)
1780 D8=PD(ES,8)
1790 D9=PD(ES,9)
1800 DA=PD(ES,10)
1810 DB=PD(ES,11)
1820 DC=PD(ES,12)
1830 DD=PD(ES,13)
1840 G=(GT*(PP))-(P3*D2)
1850 IF D1=1 THEN GOSUB 810
1860 IF D1=2 THEN GOSUB 850
1870 G=(GT*(PP))-(M1*D2)
1880 GOSUB 1050
1890 FT=FT/PP
1900 DX=FT:GOSUB 690
1910 FT=DX
1920 ST=ST/PP
1930 DX=ST:GOSUB 690
1940 ST=DX
1950 IF FT<=0 THEN FT=0
1960 FX(ES)=FT
1970 IF ST<=0 THEN ST=0
1980 SX(ES)=ST
1990 GP(ES,WS)=GT
2000 FW(ES,WS)=FT
2010 SW(ES,WS)=ST
2020 REM SB=SOCIAL SECURITY BALANCE TO BE PAID
2030 SB=SC-D7
2040 IF SB<=0 THEN SB=0
2050 IF SB=0 THEN 3130
2060 SN=GT*SP
2070 DX=SN:GOSUB 690
2080 SN=DX
2090 IF SB >= SN THEN SS(ES,WS)=SN
2100 IF SB<SN THEN SS(ES,WS)=SB
2110 ST(ES)=SS(ES,WS)
2120 REM UB=UNEMP BALANCE TO BE PAID
2130 UB=U2-DA
2140 IF UB<=0 THEN UB=0
2150 IF UB=0 THEN 2220
2160 [illegible]=GT*U1
2170 [illegible]:GOSUB 690
2180 [illegible]
2190 IF UB >= UN THEN UN(ES,WS)=UN
2200 IF UB<UN THEN UN(ES,WS)=UB
2210 UX(ES)=UN(ES,WS)
2220 ED(ES,WS)=D5+ES(ES)
2230 OT(ES,WS)=0:REM OTHER DEDUCTION TO BE PLACED HERE
2240 PD(ES,6)=D6+GT
2250 S5=SS(ES,WS)
2260 PD(ES,7)=D7+S5
2270 PD(ES,8)=D8+FT
2280 PD(ES,9)=D9+ST
2290 U5=UN(ES,WS)
2300 PD(ES,10)=DA+U5
2310 E5=ED(ES,WS)
2320 PD(ES,11)=DB+E5
2330 O5=OT(ES,WS)
2340 PD(ES,12)=DC+O5
2350 N5=PD(ES,13)
2360 PD(ES,13)=N5+(GT-(FT+ST+S5+U5+E5+O5))
2370 NAS=PDS(ES,1)
2380 PRINT #0,NAS,ES
2390 PRINT#0,"DATE ";DATES
2400 PRINT#0,"PERIOD ENDING ";
2410 PRINT#0,DWS
2420 PRINT #0
2430 PPS="00000.00   00000.00   00000.00   0000.00   000.00   00000.00   00000.00   00000.00"
2440 PRINT#0,"  GROSS        FWT         SWT        FICA    UNEMP       EXTRA        OTHER          NET"
2450 NT=(GT-(FT+ST+S5+U5+E5+O5))
2460 PRINT#0,USING PPS,GT,FT,ST,S5,U5,E5,O5,NT
2470 PRINT#0:PRINT#0
2480 T0=T0+FT:REM FWT
2490 T1=T1+ST:REM SWT
2500 T2=T2+S5:REM SS
2510 T3=T3+U5:REM UNEMP
2520 T4=T4+E5:REM EXTRA
2530 T5=T5+O5:REM OTHER
2540 T6=T6+GT:REM GROSS
2550 T7=T7+NT:REM NET
2560 GT=0:FT=0:ST=0:S5=0:U5=0:E5=0:O5=0:N5=0:SN=0:UN=0
2570 NEXT ES
2580 GOTO 1100
2590 PRINT #0, USING'TOTAL GROSS FOR PERIOD    0000000.00',T6
2600 PRINT #0, USING'TOTAL FWT   FOR PERIOD    0000000.00',T0
2610 PRINT #0, USING'TOTAL SWT   FOR PERIOD    0000000.00',T1
2620 PRINT #0, USING'TOTAL SS    FOR PERIOD    0000000.00',T2
2630 PRINT #0, USING'TOTAL UNEMP FOR PERIOD    0000000.00',T3
2640 PRINT #0, USING'TOTAL EXTRA FOR PERIOD    0000000.00',T4
2650 PRINT #0, USING'TOTAL OTHER FOR PERIOD    0000000.00',T5
2660 PRINT #0, USING'TOTAL NET   FOR PERIOD    0000000.00',T7
2670 GOTO 2720
2680 GOSUB 630
2690 PRINT"FATAL ERROR....   PROGRAM ABORTED"
2700 CLOSE 0,1,2,3,4,5,6,7,8,9,10,11

2710 END
2720 REM CHECK PRINTER HERE
2730 GOSUB 650
2740 PRINT"INSERT PAYROLL CHECKS INTO PRINTER AT THIS TIME....";CHRS(07)
2750 PRINT"ALIGN CHECKS TO TOP OF FORM...... PRESS <CR> WHEN READY";CHRS(07)
2760 INPUT LINE ANS
2770 PRINT#0,"  XXX";CHRS(13);
2780 GOSUB 650
2790 PRINT CHRS(07);"ARE THE CHECKS LINED UP AND READY TO GO (Y OR N)";
2800 INPUT ANS
2810 IF ANS="Y" THEN 2870
2820 IF ANS="N" THEN GOSUB 650
2830 IF ANS="N" THEN PRINT"RE-ALIGN CHECKS AND PRESS <CR> WHEN READY..."
2840 INPUT LINE ANS
2850 GOTO 2770
2860 GOTO 2780
2870 PRINT#0
2880 FOR ES=1 TO 100
2890 REM CHECK FOR '0' GROSS, TERMINATED EMPLOYEE OR EOF
2900 IF LEFTS(PDS(ES,1),1)=CHRS(0) THEN 1100
2910 IF PD(ES,3)=3 THEN NEXT ES
2920 IF GS(ES)=0 THEN NEXT ES
2930 NAS=PDS(ES,1)
2940 ADS=PDS(ES,2)
2950 CTS=PDS(ES,3)
2960 PRINT#0
2970 PRINT#0
2980 PRINT#0,TAB(74);DWS
2990 PRINT#0,USING CPS,HR(ES),OV(ES),RT(ES),RO(ES),GS(ES)
3000 LT=4
3010 FOR LC=1 TO LT
3020 PRINT#0
3030 NEXT LC
3040 PRINT#0,TAB(33);"UNEMP";TAB(43);"OTHER";TAB(53);"EXTRA"
3050 FOR LC=1 TO 3
3060 PRINT#0
3070 NEXT LC
3080 PRINT#0,USING'  0000.00    0000.00    0000.00    0000.00    0000.00    0000.00',ST(ES),FX(ES),SX(ES),UX(ES),A,ES(ES)
3090 FOR LC=1 TO 2
3100 PRINT#0
3110 NEXT LC
3120 NT=GS(ES)-(SS(ES)+FX(ES)+SX(ES)+UX(ES)+A)
3130 PRINT#0,"     ";NAS
3140 PRINT#0,USING'                                                  0000.00',NT
3150 LT=13
3160 FOR LC=1 TO LT
3170 PRINT#0
3180 NEXT LC
3190 S0=40
3200 S9=63
3210 PRINT#0,TAB(S9);DATES;TAB(S0);
3220 PRINT#0,USING'0**00000.00',NT
3230 PRINT #0
3240 PRINT#0,TAB(10);NAS
3250 PRINT#0,TAB(10);ADS
3260 PRINT#0,TAB(10);CTS
3270 LT=8
3280 FOR LC=1 TO LT
3290 PRINT#0
3300 NEXT LC
3310 NEXT ES
3320 STOP
```

PAYROLL MENU   (C) 1980 WAYNE LEIMER   11-20-80   PAGE 1

```
10 PCS=""ALLOW ALL"
20 PRINT CHRS(27);CHRS(60);CHRS(13)
30 X=PEEK (HEX("C100"))
40 IF X=55 THEN 150
50 PRINT"PLEASE ENTER YOUR PASSWORD   ";
60 FOR A=1 TO 5
70 PRINT CHRS(127);CHRS(13);
80 AS=INCHS(0)
90 PRINT CHRS(13);CHRS(133);
100 PWS=PWS+AS
110 NEXT A
120 PRINT CHRS(27);CHRS(69);CHRS(13)
130 IF PWS=PCS THEN 140 ELSE END
140 POKE HEX("C100"),55
150 PRINT"TYPE A   (D) FOR DATABASE"
160 PRINT"         (P) FOR PAYROLL"
170 PRINT"         (F) FOR FILE-EDIT"
180 PRINT"         (R) FOR REPORTS"
190 PRINT"         (E) TO END PROGRAM"
200 AAS=INCHS(0)
210 IF AAS="E" THEN 300
220 IF AAS="D" THEN CHAIN "0.DATABASE"
230 IF AAS="P" THEN CHAIN "0.PAYROLL"
240 IF AAS="F" THEN CHAIN "0.FILEDIT"
250 IF AAS="R" THEN CHAIN "0.REPORT"
260 PRINT CHRS(27);CHRS(80);CHRS(12)
270 PRINT"INPUT ERROR..... PLEASE RETYPE"
280 PRINT:GOTO 150
290 POKE HEX("C100"),00
300 END
```

REPORT GEN   (C) 1980 [illegible]   11-20-80   PAGE 1

```
10 X=PEEK(HEX("C100"))
20 IF X=55 THEN 30 ELSE CHAIN"0.MENU"
30 PPS='0000000.00  000000.00  0000000.00  000000.00  0000.00  00000.00  00000.00'
40 PP=52:REM PERIODS IN YEAR
50 PPS='000000.00  0000.00  000000.00  00000.00  000.00  0000.00  0000.00'
60 GOTO 80
70 PRINT CHRS(27);CHRS(69);CHRS(12):RETURN
80 GOSUB 70
90 DIGITS 10
100 ON ERROR GOTO 120
110 GOTO 190
120 GOSUB 70
130 IF ERR <> 30 THEN ON ERROR GOTO 0
140 PRINT"*****INPUT ERROR*****"
150 PRINT"NUMERIC  FIELD  ONLY!"
160 PRINT"   PLEASE   RETYPE"
170 PRINT
180 RESUME
190 REM COPYRIGHT (C) 1980 WAYNE LEIMER
200 OPEN "1.PDA" AS 1
210 OPEN "1.PP" AS 2
220 OPEN "1.GP" AS 3
230 OPEN "1.SS" AS 4
240 OPEN "1.FW" AS 5
250 OPEN "1.SW" AS 6
260 OPEN "1.UN" AS 7
270 OPEN "1.OT" AS 8
280 OPEN "1.ED" AS 9
290 OPEN "1.PE" AS 10
300 OPEN "1.DT" AS 11
310 DIM #1,PDS(100,3)=32
320 DIM #2,PD(100,14)
330 DIM #3,GP(100,PP)
340 DIM #4,SS(100,PP)
350 DIM #5,FW(100,PP)
360 DIM #6,SW(100,PP)
370 DIM #7,UN(100,PP)
380 DIM #8,OT(100,PP)
390 DIM #9,ED(100,PP)
400 DIM #10,PES(PP,1)=8
410 DIM #11,DTS(PP)=9
420 GOSUB 70
430 PRINT"TYPE A     (T) FOR YEAR TO DATE TOTALS"
440 PRINT"           (S) FOR COMPLETE SUMMARY"
450 PRINT"           (M) FOR SPECIAL REPORTS"
460 PRINT"           (E) TO EXIT THIS PROGRAM"
470 PRINT
480 ANS=INCHS(0)
490 PRINT
500 IF ANS="T" THEN 560
510 IF ANS="E" THEN 840
520 IF ANS="S" THEN 860
530 IF ANS="M" THEN 1210
540 GOSUB 70
550 PRINT"***** INPUT ERROR *****":PRINT:GOTO 430
560 REM YEAR TO DATE TOTALS
570 PRINT
580 PRINT"PRINTED COPY REQUIRED (Y OR N)    ";:AAS=INCHS(0)
590 GOSUB 70
600 IF AAS="Y" THEN OPEN"0.SERIAL.SYS" AS 0
610 IF AAS="N" THEN OPEN"0.SERIAL.SYS" AS 0:CLOSE 0
620 FOR ES=1 TO 100
630 IF LEFTS(PDS(ES,1),1)=CHRS(0) THEN 730
640 T6=T6+PD(ES,6)
650 T7=T7+PD(ES,7)
660 T8=T8+PD(ES,8)
670 T9=T9+PD(ES,9)
680 TA=TA+PD(ES,10)
690 TB=TB+PD(ES,11)
700 TC=TC+PD(ES,12)
710 NEXT ES
720 IF AAS="Y" THEN PRINT#0,CHRS(12)
730 PRINT #0,USING 'TOTAL GROSS (YTD) IS    0000000.00',T6
740 PRINT #0,USING 'TOTAL FICA  (YTD) IS    0000000.00',T7
750 PRINT #0,USING 'TOTAL FWT   (YTD) IS    0000000.00',T8
760 PRINT #0,USING 'TOTAL SWT   (YTD) IS    0000000.00',T9
770 PRINT #0,USING 'TOTAL UNEMP (YTD) IS    0000000.00',TA
780 PRINT #0,USING 'TOTAL EXTRA (YTD) IS    0000000.00',TB
790 PRINT #0,USING 'TOTAL OTHER (YTD) IS    0000000.00',TC
800 T6=0:T7=0:T8=0:T9=0:TA=0:TB=0:TC=0
810 PRINT:PRINT
820 IF AAS="Y" THEN CLOSE 0
830 GOTO 430
840 CLOSE 1,2,3,4,5,6,7,8,9,10,11
850 CHAIN "0.MENU"
860 REM SUMMERY REPORT HERE
870 PRINT"PRINTED COPY REQUIRED (Y OR N)    ";:ANS=INCHS(0)
880 GOSUB 70
890 IF ANS="Y" THEN OPEN"0.SERIAL.SYS" AS 0
900 IF ANS="N" THEN OPEN"0.SERIAL.SYS" AS 0:CLOSE 0
910 IF ANS="Y" THEN PRINT#0,CHRS(12)
920 PRINT#0,"EMPLOYEE #";TAB(12);"    GROSS      FICA       FWT       SWT   UNEMP    EXTRA     OTHER"
930 FOR ES=1 TO 100
940 IF LEFTS(PDS(ES,1),1)=CHRS(0) THEN 1130
```

```
950 T5=PD(E%,5)
960 T6=PD(E%,6)
970 T7=PD(E%,7)
980 T8=PD(E%,8)
990 T9=PD(E%,9)
1000 TA=PD(E%,10)
1010 TB=PD(E%,11)
1020 TC=PD(E%,12)
1030 Y6=Y6+T6
1040 Y7=Y7+T7
1050 Y8=Y8+T8
1060 Y9=Y9+T9
1070 YA=YA+TA
1080 YB=YB+TB
1090 YC=YC+TC
1100 PRINT#0,E%;TAB(13);
1110 PRINT#0,USING PF$,T6,T7,T8,T9,TA,TB,TC
1120 NEXT E%
1130 PRINT;Y6=0;Y7=0;Y8=0;Y9=0;YA=0;YB=0;YC=0
1140 PRINT#0:PRINT#0:PRINT#0
1150 PRINT#0,"YEAR TO DATE TOTALS"
1160 PRINT#0,"      GROSS      FICA        FWT        SWT    UNEMP     EXTRA     OTHER"
1170 PRINT#0,USING PF$,Y6,Y7,Y8,Y9,YA,YB,YC
1180 Y6=0:Y7=0:Y8=0:Y9=0:YA=0:YB=0:YC=0
1190 PRINT#0:PRINT#0
1200 GOTO 430
1210 REM SPECIAL REPORTS START HERE
1220 GOSUB 70
1230 PRINT"ENTER THE EMPLOYEE NUMBER (TYPE A '0' FOR ALL EMPLOYEE'S)  ";
1240 INPUT E%
1250 IF E%=0 THEN 1680
1260 PRINT"ENTER THE STARTING WEEK   ";
1270 INPUT SW%
1280 PRINT"ENTER THE ENDING WEEK   ";
1290 INPUT EW%
1300 PRINT"PRINTED COPY REQUIRED  (Y OR N)   ";:AN$=INCH$(0)
1310 IF AN$="Y" THEN OPEN"0.SERIAL.SYS" AS 0
1320 IF AN$<>"Y" THEN OPEN"0.SERIAL.SYS" AS 0:CLOSE 0
1330 IF AN$="Y" THEN PRINT#0,CHR$(18)
1340 GOSUB 70
1350 NA$=PD$(E%,1)
1360 PRINT NA$;"EMPLOYEE NUMBER   ";E%
1370 PRINT #0
1380 PRINT#0,"    GROSS     FICA        FWT        SWT   UNEMP    EXTRA    OTHER";
1390 PRINT#0,"    ";"PAY DATE"
1400 FOR W%=SW% TO EW%
1410 GP=GP(E%,W%)
1420 SS=SS(E%,W%)
1430 FW=FW(E%,W%)
1440 SW=SW(E%,W%)
1450 UN=UN(E%,W%)
1460 ED=ED(E%,W%)
1470 OT=OT(E%,W%)
1480 PI$=PE$(W%,1)
1490 IF LEFT$(PI$,1)=CHR$(0) THEN 1610
1500 OT$=OT$(W%)
1510 T1=T1+GP
1520 T2=T2+SS
1530 T3=T3+FW
1540 T4=T4+SW
1550 T5=T5+UN
1560 T6=T6+ED
1570 T7=T7+OT
1580 PRINT#0,USING PF$,GP,SS,FW,SW,UN,ED,OT;
1590 PRINT#0,"    ";OT$
1600 NEXT W%
1610 PRINT#0
1620 PRINT#0,USING PF$,T1,T2,T3,T4,T5,T6,T7;
1630 PRINT#0,"    TOTALS"
1640 T1=0:T2=0:T3=0:T4=0:T5=0:T6=0:T7=0
1650 PRINT#0
1660 IF LEFT$(AN$,1)="Y" THEN CLOSE 0
1670 GOTO 430
1680 GOSUB 70
1690 PRINT#0,CHR$(13)
1700 PRINT"ENTER THE STARTING WEEK   ";
1710 INPUT SW%
1720 PRINT"ENTER THE ENDING WEEK   ";
1730 INPUT EW%
1740 PRINT"DO YOU WANT TOTALS ONLY (Y OR N)   ";:T$=INCH$(0)
1750 OPEN "0.SERIAL.SYS" AS 0
1760 PRINT#0,"REPORT STARTING (WEEK #)  ";SW%;"  ENDING (WEEK #)  ";EW%
1770 PRINT #0
1780 FOR E%=1 TO 100
1790 IF LEFT$(PD$(E%,1),1)=CHR$(0) THEN 2050
1800 NA$=PD$(E%,1)
1810 PRINT#0,"NAME   ";NA$;"EMPLOYEE #   ";E%
1820 PRINT#0,"    GROSS     FICA        FWT        SWT   UNEMP    EXTRA    OTHER";
1830 IF LEFT$(T$,1)="Y" THEN PRINT#0
1840 IF LEFT$(T$,1)="Y" THEN 1860
1850 PRINT#0,"    ";"PAY DATE"
1860 FOR W%=SW% TO EW%
1870 GP=GP(E%,W%)
1880 SS=SS(E%,W%)
1890 FW=FW(E%,W%)
1900 SW=SW(E%,W%)
1910 UN=UN(E%,W%)
1920 ED=ED(E%,W%)
1930 OT=OT(E%,W%)
1940 PI$=PE$(W%,1)
1950 IF LEFT$(PI$,1)=CHR$(0) THEN 2100
1960 OT$= OT$(W%)
1970 T1=T1+GP
1980 T2=T2+SS
1990 T3=T3+FW
2000 T4=T4+SW
2010 T5=T5+UN
2020 T6=T6+ED
2030 T7=T7+OT
2040 GOTO 2060
2050 GOTO 2230
2060 IF LEFT$(T$,1)="Y" THEN 2090
2070 PRINT#0,USING PF$,GP,SS,FW,SW,UN,ED,OT;
2080 PRINT#0,"    ";OT$
2090 NEXT W%
2100 PRINT#0
2110 PRINT#0,USING PF$,T1,T2,T3,T4,T5,T6,T7;
2120 PRINT#0,"    TOTALS"
2130 P1=P1+T1
2140 P2=P2+T2
2150 P3=P3+T3
2160 P4=P4+T4
2170 P5=P5+T5
2180 P6=P6+T6
2190 P7=P7+T7
2200 T1=0:T2=0:T3=0:T4=0:T5=0:T6=0:T7=0
2210 PRINT#0:PRINT#0:PRINT#0
2220 NEXT E%
2230 PRINT#0:PRINT#0
2240 PRINT#0,"*************************************************************"
2250 PRINT#0,"TOTALS FOR PERIOD ARE   "
2260 PRINT#0
2270 PRINT#0,"      GROSS      FICA        FWT        SWT    UNEMP     EXTRA     OTHER"
2280 PRINT#0,USING PF$,P1,P2,P3,P4,P5,P6,P7
2290 P1=0:P2=0:P3=0:P4=0:P5=0:P6=0:P7=0
2300 PRINT#0,"*************************************************************"
2310 PRINT#0:PRINT#0:PRINT#0:PRINT#0:PRINT#0
2320 GOSUB 70
2330 CLOSE 0
2340 GOTO 430
```

T FORTH

tFORTH — A Complete Language System for the 68XX
by Dale L. Puckett

When you type FORTH and leave the familiar world of your favorite high-level language for the first time you'll find its like going on an Adventure. Typing a command will be like picking up a rock in the desert--you may unleash the power of your micro or uncover a hungry snake. But after a few hours you will be typing words that manipulate the innards of your machine with the speed and efficiency of machine code. And, you'll be doing it interactively.

WHAT ABOUT FORTH?

Before diving into the intimate details of tFORTH from Kenyon Microsystems, a brief look at the pros and cons of the language itself is warranted. Learning FORTH is like learning a foreign language. If you read about it and don't use it, you will never learn it. On the other hand, if you sit down at a terminal and start typing those strange words, you'll be amazed at how fast you pick it up. And at the same time, you'll develop a greater appreciation for the details that make your micro tick.

FORTH is small and fast. The tFORTH interpreter is less than 8K bytes long and machine control programs which have had all unused words removed from the FORTH dictionary often use less than a thousand bytes.The language is fast because it is threaded. A FORTH word is made up of a list of addresses that point to machine language routines that do the work.

THIS ONE'S REALLY FAST!

The 6809 tFORTH is extremely fast and when I ran the benchmark routines from the October 1977 issue of Kilobaud Microcomputing, tFORTH came in two to three times faster than TSC's BASIC. This is impressive since that BASIC is one of the fastest on any micro. Yet, there is an explanation—the 6809 is well suited for FORTH. The language uses two stacks in memory and this processor has two 16-bit stack pointers. The 6809 allows the indirect and auto-increment addressing modes and makes it possible to write FORTH's NEXT loop in only four bytes that execute in 14 machine cycles. This loop is the most executed loop in the language and is the one that moves through the list of addresses that make up a FORTH word.

MORE PROS AND CONS

Other pros include the fact that FORTH is structured, extensible and highly portable. In fact, you are forced to use structured programming since there is no "GOTO" statement. Extensible means that you can define new system functions in terms of functions that are already in the dictionary. Since FORTH compiles your new words immediately, you may use them as quickly as you can define them. FORTH is portable because most of its words have been defined to do the same operation regardless of the host computer.

On the negative side, you should be warned that FORTH is very hard to read. Since the language uses a stack architecture you will find that very few programmers use named variables. Well selected names help you understand a program and the scarcity of their use in FORTH makes it absolutely essential that you include complete comments in your programs. If you don't, you won't be able to read them yourself the next day. Another disadvantage of FORTH is the

fact that it requires you to use reverse Polish notation. Instead of typing " 5 + 3 = ", you will be required to type, " 5 3 + " . It takes some getting used to unless you were weaned on a Hewlett-Packard calculator.

IT COMES IN THREE SHAPES

The tFORTH language system from Kenyon is available in three different packages. If you are a beginner and just want to get a feel for the language, you will probably only want the basic tFORTH package. It gives you the entire standard vocabulary published by the International Standards team at the FORTH Interest Group (FIG) in May of 1979 plus additional words that let you read or write standard FLEX text files and FORTH's virtual memory screen files. It can also simulate disk blocks in memory, making it possible for you to use it with cassette tape storage.

If you are a hardcore bit hacker and already familiar with FORTH, you will be interested in tFORTH+. It includes the complete tFORTH vocabulary plus more than half a disk of FORTH source code that extends the capability of the system beyond the FIG model. Extensions include a full assembler that uses Motorola-like mnemonics, a full screen editor, additional data types such as vectors and arrays, and several types of CASE statements.

If you are an application programmer working with engineering data or instrument control you will be interested in firmFORTH. It generates short, self-contained, romable code which may be used in stand-alone control environments.

IT'S EASY TO USE

tFORTH is easy to use. To enter the language from FLEX, you simply type FORTH. After bringing up the system and following the step by step directions for making two backup copies, I typed " 0. DEMO" READ and watched the system demonstrate various features of the language. Then, I began to experiment. First, I exercised some of the more common words before moving on to define a few of my own. I was amazed at how fast I could create and test a word. The time consuming edit, compile, link and load sequences required by many compiler languages was not needed.

One feature of tFORTH that is easy to get used to is the concept of virtual memory. You never have to save a program. The system does that for you automatically. If you are editing one of the screens and type a word that causes another screen to be loaded into the buffer, it will save the screen you were working on before reading in the new one.

Operation of the editor is simple and almost self-explanatory. I tested the standard fig-FORTH editor first and used it to adapt the full screen editor to my GIMIX 80 X 24 video board. It is shipped configured for use with the SWTPC CT-82 terminal. All of the control codes are defined on one screen and it is an easy matter to re-define them.

The assembler is invoked by typing the word CODE. This word is like a colon definition except that it generates pure machine code. After a word is created by a CODE definition it is placed in the dictionary and may be used just like any other FORTH word. The only thing that will slow you down is the reverse Polish notation. After using the standard mnemonics, ie, LDA [44] for years it is hard to get used to 44 [ ] .A LD, . You will also have to be careful to not use any forward references in your code since this is a one-pass assembler.

CALL THEM BY NAME

The disk utilities supplied with tFORTH performed as advertised in the glossary. I loaded additional programming tools by typing their name. For example, one screen contains words that help you document your programs. I typed "TOOLS" and immediately started to use them. Other screens create CASE statements, define STRING handling words, enable DOUBLE precision math, make it easy to DEBUG and PRINT. They may be loaded interactively from the keyboard or by another screen.

HOW'S THE INSTRUCTION BOOK?

The manual I received came in an attractive three-ring binder and was more then 110 pages long. It was divided into five volumes; tFORTH, tFORTH+, firmFORTH and two extensive glossaries. The table of contents in each volume supplied plenty of detail and was easy to use.

The glossaries total 47 pages and contain the complete definitions of 287 FORTH words in ASCII sort order. Sixty of the words are extensions to standard fig-FORTH.

Step-by-step instructions tell you how to bring up the system and backup the supplied disk. Then, they show you how to adapt tFORTH to another disk operating system or terminal. The manuel includes well documented source code for all disk, terminal and printer drivers. It even leads you through a few short exercises that introduce you to the language. More material of this nature would improve the manuel.

WHAT HAPPENS WHEN YOU GOOF?

The system will survive a lot of insults. Most of the time if you make a mistake, like typing a word that is not in the dictionary, tFORTH will echo the mistake and a question mark. Nearly 30 English language error messages are provided and they lead you direct to the problem. I made many unusual demands on tFORTH and never did crash it. The fact that the system automatically keeps its disk screens current keeps you from losing a lot of data.

DOES THE COMPANY TAKE CARE OF YOU?

I can not say enough about the helpful attitude of Tom Kenyon, the President of Kenyon Microsystems. When I first received my system, I had quite a few questions. I called Tom at his Houston office and in less than an hour Ray Talbot, the programs author had returned my call from California. Ray was on the committee that helped design the fig-FORTH standard so you can bet his coding will live up to your expectations. He was very helpful on the phone and took my naivete in stride. A month later, without asking, I received an envelope with a few pen and ink changes to the manual and a new version of tFORTH+ and firmFORTH. Tom and Ray also made sure that I received a copy of the CAI course, "Going FORTH" as soon as it was available on a 5-inch disk. CAI is a fantastic way to learn a new language.

WHAT'S THE BOTTOM LINE?

tFORTH is a full coding of the fig-FORTH standard written by a member of the standards team. It is a useful addition to your arsenal of programming tools. If you are a beginner, do buy a copy of "Going FORTH" from Kenyon when you order your system.

WHAT EQUIPMENT DO YOU NEED?

Any 6800/6809 computer operating under FLEX.

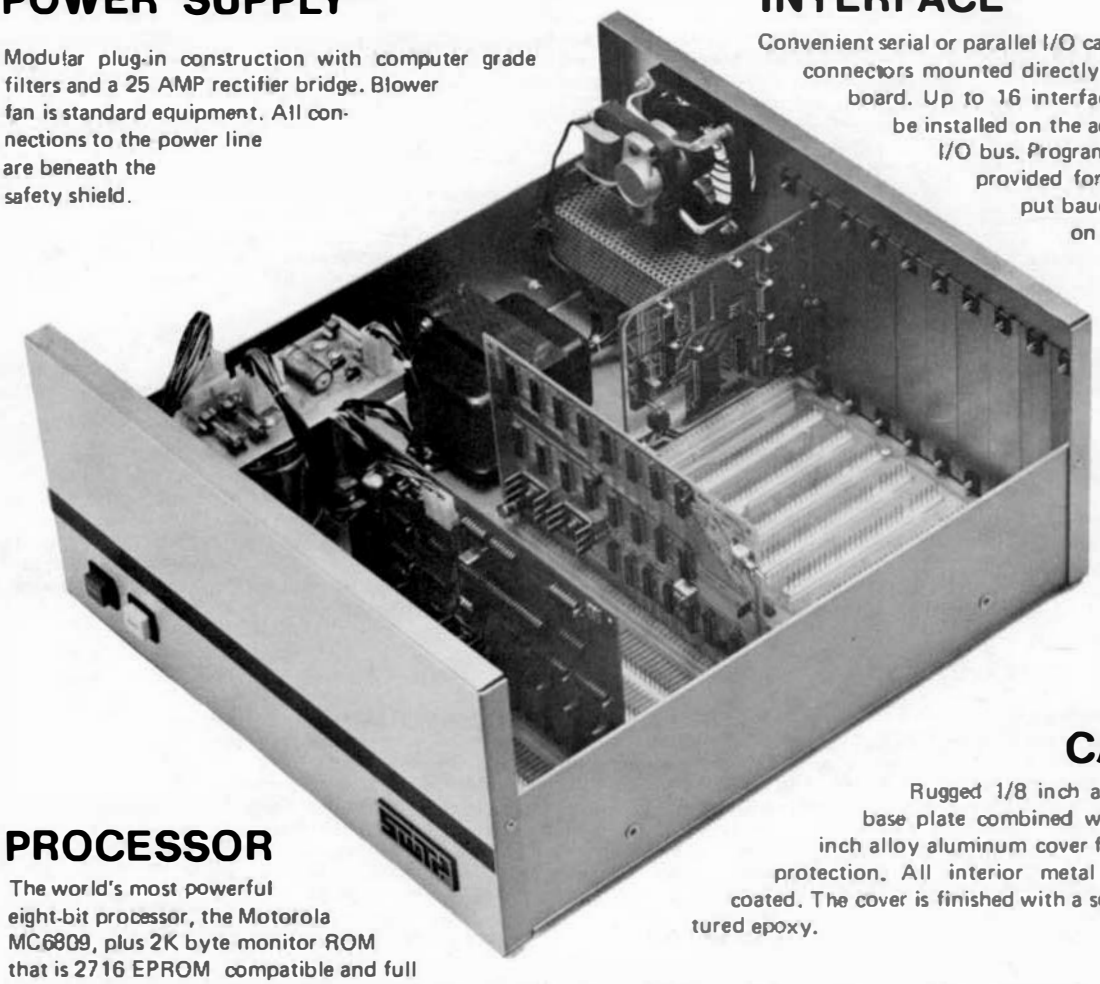
WE HAVE A 6809 FOR YOU

POWER SUPPLY

Modular plug-in construction with computer grade filters and a 25 AMP rectifier bridge. Blower fan is standard equipment. All connections to the power line are beneath the safety shield.

INTERFACE

Convenient serial or parallel I/O cards have DB-25 connectors mounted directly on the circuit board. Up to 16 interface devices may be installed on the address decoded I/O bus. Programming strips are provided for input and output baud rate selection on each port. All outputs are fully buffered.



CABINET

Rugged 1/8 inch alloy aluminum base plate combined with a solid 1/8 inch alloy aluminum cover for unsurpassed protection. All interior metal is conversion coated. The cover is finished with a super tough textured epoxy.

PROCESSOR

The world's most powerful eight-bit processor, the Motorola MC6809, plus 2K byte monitor ROM that is 2716 EPROM compatible and full buffering on all output lines. Built-in multiuser capability, just add I/O cards to operate a multi-terminal system.

MEMORY— You can purchase the computer with either 8K bytes of RAM memory (expandable to 56K), or with the full 56K. The efficient, cool running dynamic memory used in this system is designed and manufactured for us by "Motorola Memory Systems Inc."

PERIPHERALS—The wide range of peripheral hardware that is supported by the 6809 includes: dot matrix printers (both 80 and 132 column), IBM Electronic 50 typewriter, daisy wheel printers, 5-inch floppy disk system, 8-inch floppy disk systems and a 16 megabyte hard disk.

SOFTWARE— The amount of software support available for the 6809 is incredible when you consider that it was first introduced in June, 1979. In addition to the FLEX9 operating system, we have a Text Editor, Mnemonic Assembler, Debug, Sort-Merge, BASIC, Extended BASIC, MultiUser BASIC, FORTRAN, PASCAL and PILOT.

69/K Computer Kit with 8K bytes of memory . . . . . $ 495.00
69/A Assembled Computer with 8K bytes of memory . . . . . $ 595.00
69/56 Assembled Computer with 56K bytes of memory. $1,595.00

SWTPC

SOUTHWEST TECHNICAL PRODUCTS CORPORATION
219 W. RHAPSODY
SAN ANTONIO, TEXAS 78216 (512) 344-0241

6809 DISK SYSTEMS

All disk systems are supplied with our version of FLEX 9, the world standard disk operating system for the 6809. Our systems normally operate in double density format, but they are compatible with single density, or single sided recording formats. FLEX is supplied with over forty utillties, many of which are only available with our systems.

Our disk systems offer you mass storage at low cost. The cost per thousand bytes of storage for our various systems is shown in the chart. Other 6809 disk systems have costs up to three times greater for the same general type drive.

TYPE	CAPACITY	COST
D-5	720,000 bytes	$1.80 per/K
DT-5	1,400,000 bytes	$1.16 per/K
DMF-2	2,400,000 bytes	$1.04 per/K
CDS-1	16,000,000 bytes	$ .27 per/K

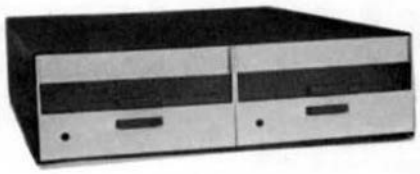
D-5 Two double sided, double density, 5" disk drives with a total on line capacity of 720,000 bytes of data. Includes cabinet, power supply, connecting cable and controller. Controller will operate up to four drives. This is an ideal disk system for small stand alone word processing systems, or for businesses that do not work with large inventories.

14 x 6 x 10 – 20 lbs $1,295.00

D-5 or DT-5

DT-5 Double track density version of the D-5. The DT-5 uses two 96 track per inch drives to provide an on line capacity of 1,400,000 bytes. Includes cabinet, power supply, connecting cable and controller. Controller will operate up to four drives. This is a disk system with enough capacity to include small inventories of up to 1,000 items, plus the usual business package of general ledger payroll, etc.

14 x 6 x 10 – 20 lbs $1,695.00



DMF2

DMF-2 Double sided, double density, dual eight-inch disk system with an on line capacity of 2,400,000 bytes. Our "top of the line" disk system features a DMA type controller for fastest possible data transfers. This drive was designed for larger businesses and multi user installations. The DMF-2 will provide the fast operation necessary for systems running multiterminals under the UniFLEX operating system. Complete with a heavy duty 1/8-inch metal cabinet, power supply, connecting cable and controller. The controller will operate up to four drives.

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CDS-1 This "Winchester" type hard disk provides both large storage capacity and high speed operation. The CDS-1 is the answer for systems that must handle large inventories or systems with more than four terminals. The controller hes its own processor and uses DMA data transfer.

CDS-1 – 115 lbs $4,395.00

CDS-1

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firmFORTH — $350

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Houston, Texas 77042

A MINI-TOUR OF FORTH
by Dale L. Puckett

If you're a beginner and have only casually glanced at FORTH source code, you've probably been scared away. I have included this tutorial with my review of Kenyon Microsystems tFORTH to help belay some of your fears. Once you understand the language, it will really grow on you.

SAY HELLO

If you are like me, the first thing you do when you walk into a computer store is type, PRINT "HELLO DUMMY" on the keyboard of the consumer micro that's on display. Thank's to the miracle of read only memory, it probably answers you promptly.

If you try the same thing on a machine running FORTH it will probably say, "PRINT ?" and leave you scratching your head. So, let's get started by making the language say Hello.

It's simple. Just type, ." HELLO DUMMY" . Most likely your friendly FORTH machine will echo HELLO DUMMY OK on the same line. The ." that you typed is a forth "word" that means print everything until you run into another quote mark.

You should note here that all FORTH words must be surrounded by at least one space on each side. This delimits the word from anything else you type. Also you might be interested to know that your words may be as long as 31 characters. In other words, PRINT-HELLO-FOR-ME could be defined as a word.

If you don't want the message to appear on the same line as your command, try this. CR ." HELLO DUMMY" . Now let's move on by demonstrating one of FORTH's main features, its extensibility. What'd he say?

Type, : PRINT-HELLO-FOR E CR ." HELLO DUMMY" ;

FORTH will reply OK and you will have just defined your first FORTH word. If you don't believe it, type PRINT-HELLO-FOR-ME . Your micro will do a carriage return, line feed and print HELLO DUMMY . Of course, you could have called your word NAME . Then you wouldn't have to type so many characters. I'll bet you can already see the possibilities. Let's move on to the numbers.

NUMBERS GAME

Type your wife's age followed by a carriage return. FORTH will echo OK. It didn't even repeat her age. She'll love this language, uh?

Never fear, the number you typed hasn't disappeared. It's stored safely on the top of FORTH's stack. Type a . or DOT . You say your wife blew her stack when her age appeared on the terminal. Oh well, at least you know how to print the number on the top of FORTH's stack.

Just so you'll understand the stack a little better try typing your age, followed by your wife's age, followed by one of your children's age. Type a carriage return after each age just like you do when you answer BASIC's Input prompt.

Now, type three periods. Make sure there is at least one space on each side of every period like this: . . .

Did you notice what happened. FORTH printed your childs age, your wife's age, and then your age. Why were they printed in reverse order? It's simple, you pushed them on the stack one at a time. FORTH then pulled them off and printed them one at a time. The last one you entered was on the top of the stack when you finished your entries. So, it was the first to be printed. FORTH uses what is called a First In, Last Out or LIFO stack. Go ahead, play around with a few more numbers.

IT ALL ADDS UP

Want to try some math? Type 10 10 + . followed by a carriage return. FORTH replied 20 OK didn't it. Congratulations, you have done your first addition.

Here's how it happened inside FORTH. The first 10 was pushed on the stack. It was followed by the second 10. Then, FORTH read the plus sign and consulted its dictionary. It discovered that + meant that it was supposed to take the top item on the stack and add it to the next item down and leave the result on the top of the stack. Finally, when FORTH got to the . it knew what to do. It printed the top item on the stack. I told you this stack stuff wasn't too bad. And, FORTH has other words for subtraction, multiplication and division. It even has a special word called MOD which will give you the remainder after a division.

Want to define another word? OK. Let's pretend that we need a word that will cause FORTH to add 10 to whatever is on the top of the stack. Try this. Type : ADD-TEN 10 + . ; FORTH should echo OK. Now type: 20 ADD-TEN . FORTH should answer 30 OK.

IT'S NOT REALLY GREEK

If you've glanced at FORTH before you have probably noticed a bunch of strange words that didn't make any sense. Let's look at a few of them.

DUP is pronounced dupe. It takes the number on the top of the stack and places another copy on the top. In other words, if you start out with a 10 on top and type DUP, you will have two 10's—one on top of the stack and one in the next position down as soon as you hit return.

Those other unfamiliar words carry out similar tasks. SWAP will reverse the order of the top two items on the stack. DROP will throw the top item on the stack away. Goodbye forever.

OVER will take the second item in the stack and put it on top. ROT will take the third item on the stack and move it to the top. MAX will save the larger of the top two numbers on the stack. Guess what MIN does.

To really learn these, you'll need to try them out. Type: 4 DUP + . I'll bet FORTH replied 8 OK.

Try: 4 DUP * . I'll bet the answer was 16 OK. While you're trying these, you're using one of FORTH's advantages to yours. I'll bet it never occurred to you that FORTH was interactive, did it?

LET'S PRINT SOME STARS

Let's move on and try something that requires some control. No, don't hold your breath. Remember that nasty GOTO statement in BASIC that caused you to chase some guys code all over three or four pages of type while you were trying to find out how he printed his name? You won't find it in FORTH.

What you will find, you'll like. You'll find DO LOOPs including, DO UNTIL and DO WHILE; IF THEN ELSE statements, relational operators, and a few more. We'll look at one of them here.

Let's write a short program. First we'll define a star. Type: : STAR ." *" ;

Now every time you type STAR, FORTH will print a * . Now, pretend you have a need to print 10 stars. What do you do? You could type STAR 10 times but that would be boring. Let's create a new word.

Type: : 10-STARS 10 0 DO STAR LOOP ; FORTH should echo OK and if you type 10-STARS you should see ********** OK.

Let's take it one step further and consider an application. How would you print a histograph? First, you would need to be able to print a variable number of stars. The number of stars printed would depend on the value of the variable you wanted to represent pictorially on each line of the histograph. Here we go.

Type: : XSTARS CR 0 DO STAR LOOP ; FORTH will say OK. Boy, it sure is easy to please. Now, type: 10 XSTARS . Nine'll get you ten that it printed ********** OK. Right? Try 50 XSTARS . It's amazing, isn't it?

NO MORE SAVE AND LOAD

Want to know another secret? If you had used the editor that is part of FORTH to type the sequences into a screen, FORTH would have saved it for you automatically. Then, if you loaded that screen later, the words you defined would be put in the dictionary and you could use them at will.

Let's try something else. Have you ever been in a position where you knew you needed a particular bit pattern to make a machine do a specific task, but, it was a real pain to draw out a series of 1's and 0's so you could convert it to HEX, so you could go through another calculation you couldn't remember to convert it to decimal for BASIC. Its a piece of cake with FORTH.

Type: HEX 10 DECIMAL . FORTH answered 16 OK didn't it? Try this: 2 BASE ! 1101 DUP HEX . DECIMAL . Did FORTH reply D 13 OK? Now try: 7 2 BASE ! . I'll bet you got 111 for an answer. Right?

Unfortunately, space here is limited and we must secure this mini-tutorial or it will no longer be mini. I'll leave you with only one thought--in the session above we have only looked at about a dozen of the 287 words available in the †FORTH+ dictionary. It should keep you out of trouble for a while.

BIT Bucket

Dear Don:

As per our telecon on Tues 9-dec-80 it seems that a lot of people are wondering how to eliminate the date message on startup of FLEX 9.0 without bombing the STARTUP.TXT execution. It's a problem that seems to be quite trivial -- until you try it. After locating the portion of FLEX 9.0 that is responsible for the message one needs to simply jump around it or NOP it out as in FLEX 2.0. WRONG!! For some BIZARRE reason the startup file just would not execute. After a full frustating day of beins determined that no such 'trivial' problem was going to get the better of me I located the problem -- TIMING!! It appears that the disk is accessed to open the startup file before the head has a chance to recover and hence the message 'DRIVE$ NOT READY'. The easy fix to this is to simply replace the date input routine with about a one second delay. Other systems may require a little more or less to work best. Here's my fix:

Flex (TM) looks like this:

```
                ORG     $CA5E   FOR 8" OR $CA50 FOR 5" DRIVES
.... Start patch here to eliminate date print
  (CAD9)                        5" DRIVES
8E CADE GETDAT  LDX     #DATMSG SET UP DATE MSG POINTER
BD CE04         JSR     PSTRNG  (INTERNAL POINTER)
.... Start patch here to keep print out but eliminate input
BD CE2F         JSR     INBUF   (INTERNAL POINTER)
BD 58           BSR     INDEC2  GET DECIMAL # FROM BUFFER
25 F3           BCS     GETDAT  REPEAT IF ERROR
B7 CC0E         STA     SYSMTH  SYSTEM MONTH
      ... repeate last three for SYSDAY and SYSYR
BD CE05 CONT    JSR     PCRLF   PRINT <CR> <LF>
  (CE04)                        5" DRIVE
      ... set up for STARTUP.TXT execution

                ORG     $CADE   FOR 8" OR $CAD0 FOR 5" DRIVES
44 41 .. DATMSG FCC     /DATE (MM-DD-YY)? /,EOT
```

One needs to replace the above code depending on whether you want to eliminate the date message (which you can replace with your own 17 character message if desired) with a delay.

```
                ORG     (SEE ABOVE)
86 02           LDA     #2
BE 0000         LDX     #0
30 01   LOOP    INX
26 FC           BNE     LOOP
4A              DECA            DECREMENT ORAND COUNT
26 F9           BNE     LOOP
7E ....         JUMP    $CA7C   8" OR $CA6E 5" DISK

        ORG     $CADE   8" OR $CAD0 5" DISK
DATMSG  FCC     /AT YOUR SERVICE !/  YOUR MESSAGE HERE
        FWD
```

I hope this eliminates a lot of problems for those people who have calender boards in their system and don't like to type extraneous garbage on booting.

One last word (plus) here -- This letter was composed on the STYLOGRAPH (TM) word processing system with a Gimix 80x24 video board and I just think this is the slickest editor/word processor since buttered toast. This is the first editor (and I've used more than 5 of the big ones) that lets me compose what I want to say and modify it while I'm typing it in. It's great for source code too!

Sincerely,

Matthew Scudiere
Oak Ridge, Tenn

STAR-KITS

P.O. Box 808
Mt. Kisco, New York 10549

NEWS RELEASE

FLEX-09, a monitor-in-ROM for 6809 SS-50 bus systems, has just been introduced by Star-Kits, P.O. Box 808, Mt. Kisco NY 10549.

FLEX-09 is a direct descendant of the popular FLEX6 monitor for 6800 systems. It provides full control of a 6809 system from a serial terminal or keyboard/video board combination, including the ability to load, examine and dump memory; start, abort, and continue programs; single-step programs; insert and keep track of multiple breakpoints; control multiple I/O ports; link to user-supplied I/O routines, and more.

FLEX-09 is designed for the heavy system user who needs a dependable, powerful, and - most important - predictable monitor. The price of $75 includes two ROMs, complete manual, and either a full, commented source listing or source code on disk, as desired. Purchasers of 6800 FLEX6 may get full trade-in credit toward FLEX-09 when they upgrade to the 6809.

CARTER & SANDS, P.C.

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ATTORNEYS AT LAW
STEPHEN L. CARTER
EDWARD F. SANDS

January 12, 1981

Mr. Don Williams
'68 Micro Journal
1016 Nashii Rd.
P.O. Box 849
Hixson, Tennessee 37343

Dear Don,

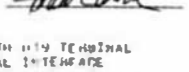
Our office has used a 6470 6800 computer for word processing applications for about three years, and during the past two years or so have used a simple Peripheral Technology disk controller card operating under FLEX". The problems with disk file read errors and slow access time with this combination are legion, so in disgust I ordered one of Dieix' disk controller cards.

I suggest that you give these people a review in the '68 Micro Journal. I can not believe the quality of the card, the speed with which it was shipped, and how well it works. I'm not terribly technically oriented, but I understand that the card has on-board data separation, and a few integrated circuits which make the 1771 more compatable with the 5.59 buss. Furthermore, by simply changing a jumper and an IC, I'll be able to use the same disk controller with the 6809 system I'm building, which uses 16 addresses per IO slot instead of 4. And the card can also be used with 8" drives.

Since we've gotten the Dieix disk controller, I've noticed a very dramatic drop in disk file read errors (from about one a day to maybe one a month). In this business, we can't afford errors.

Anyway, I would suggest that you consider a review of this fine product.

Yours truly,
CARTER & SANDS, P.C.



CONNECTING THE HEATH H19 TERMINAL
TO AN MP-B SERIAL INTERFACE

Francis HASSEN
8 Cite Straus
L-8077 BERTRANGE
LUXEMBOURG/EUROPE

Recently I swapped my antique (albeit faithful) CT-1024 terminal for a new one. I wanted a terminal with following features:

- a display having at least the standard 24 lines and 80 columns format
- a baud-rate that should be selectable from the keyboard or under software control.
- a reasonnable price
- a nice looking design and a sturdy enclosure

There exist a multitude of terminals satisfying points 1 and 2, and some are also good-looking, but finding one that allows to select the baud-rates from keyboard and under program-control (and not by flipping hardware switches) isn't quite easy. I found only two of them!

The first is the well-known CT-82 from SWTPC, which I knew well from having one at our school. This terminal has quite a lot of intelligence built-in, but it suffers from two drawbacks:

- the monitor holds in general only 16 lines (a smaller format giving more lines may be nevertheless choosen by control-codes)
- the design is, in my opinion, simply awful, and the enclosure has the stiffness of a plastic yoghourt-pot.

So there remained terminal number two, and that was the Heathkit H19. I ordered one and built it in approx. 15 hours. Assembling the kit was a pleasure,as everything was up to the highest Heathkit standards. The case is very sturdy (in fact, some other computer-makers as AVI, VECTOR and WAVEMATE (see add in this journal) use the same case and keyboard) and the 12"diagonal monitor gives a sharp display,without any jitter. The softwere capabilities of the H19 are too many to enumerate, but they are easy to use.

Having assembled the terminal, I wanted to connect it to the MP-S serial interface of my SWTPC 6800 computer. Alas,the terminal had the keyboard selectable baud-rate I had been looking for, but for some mysterious reasons, the UART clock was not routed to the RS232 output connector.

Fortunately, the fix was an easy one: I connected the BAUDOUT pin (pin 15) of the UART to the input (pin 2) of a 74367 bus driver, and routed the output of the driver (pin 3) to pin 24 of the RS232 output connector. The 74367 driver had to be added to the logic board of the terminal: I fixed it on a portion of a wire-wrap board, that was mounted with a screw and a distance roll on the logic board,just at the left of the UART. I choose to follow the SWTPC convention they use when connecting their CT-82 to an MP-B, so my decision to use pin 24 of the RS232 as output for the clock. SWTPC suggest tying the CTS and RTS handshake-lines on the terminal together; I did not follow that advice, and the terminal works without a single flaw. (see Figure 1).

And [redacted] the CTS line allowed me to connect in parallel to the terminal a BABE2 printer,which uses the CTS line of the MP-S interface (see Figure 2).

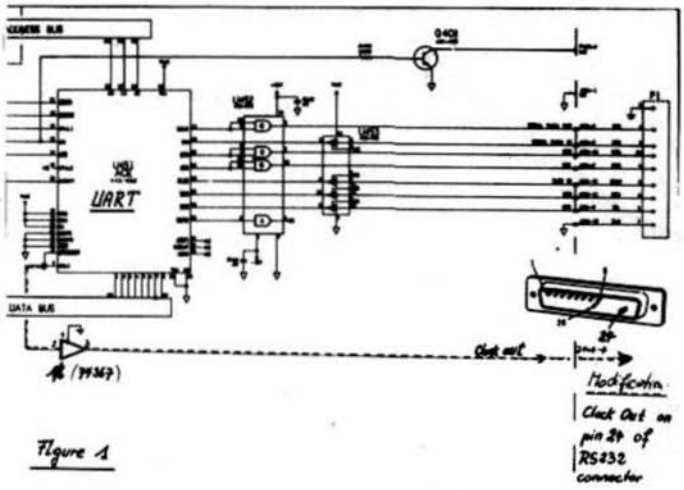


Figure 1

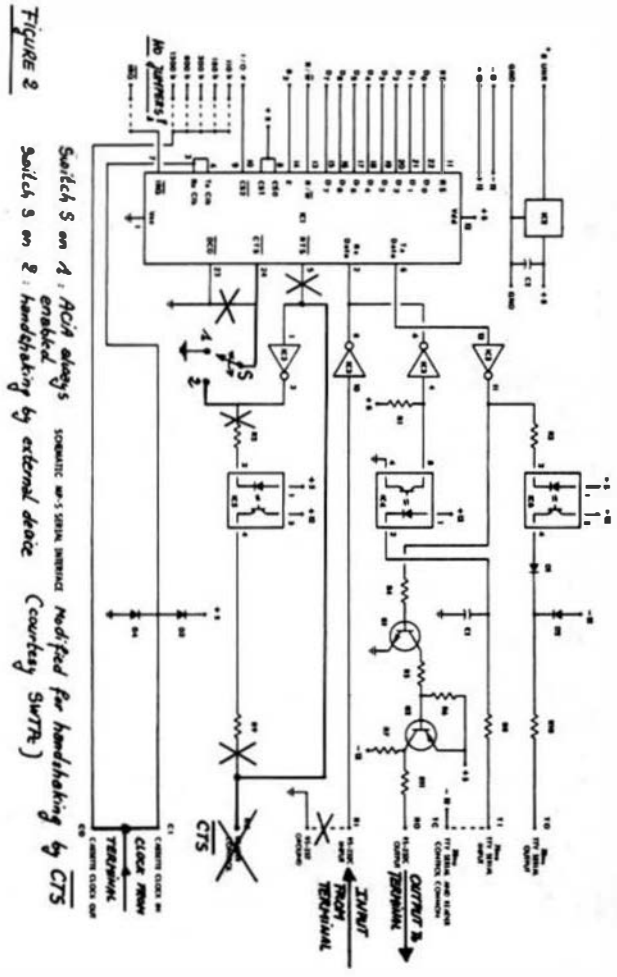


FIGURE 2

HELP

Dear Mr. Williams,
I am inquiring about software or a print routine that would allow me to use the IBM Model 50 with my SWTPC 6800/A2. Presently my IBM Model 50 is being used with a SWTPC 6809 and MP-WP interface. I am using the "SP" command that resides in FLEX 9 Version 2.6. Perhaps you know , or know someone who has, written a driver routine that can be used with the 6800. My attempts to decode and write the "SP" routine has so far been unsuccessful. Any information you may have concerning driver routines for the Model 50 would be very much appreciated. I have been an avid reader of 68' Micro Journal since your first issue. Keep up the good work. Ronald A. Mauceri PSC 6 Box 22 APO San Francisco, Ca 96277

***

Dear Sirs,
I have a Microdasys 6809 S-100 IEEE computer with 32K RAM. Which works like a champ under the cassette system that is supplied. I now wish to upgrade to a Disk and have decided on using TSC's "FLEX". TSC currently makes a user adaptable version of FLEX. My system is hardware compatable for FLEX. I have been looking for someone who has already adapted FLEX to a S-100 system. As of yet I haven't found anyone. I am sure that there are other 6809 S-100 people who would be interested in this matter. I would greatly appreciate you printing this. Richard McMahon PO Box 57 NSGP FPO Seattle, Wa 98762

***

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***

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***

SWTPC PR-40, $100. CT-64, $100. Three MP-M, $25 each. Working, Socketed, with Documentation. Bob Felton (714) 729-5519

LUCIDATA PASCAL RELEASE 3

for 6800 and 6809 systems

LUCIDATA proudly announces that Release 3 of it's P-6800 Pascal is being distributed NOW.

It's good news also for all you 6800 users out there - WE haven't deserted you - Release 3 runs on your machine too although our FULLY OPTIMISED CODE for the 6809 version is faster and shorter! Release 3 is an almost full implementation of the proposed ISO standard for Pascal (there are no full micro implementations). Included in the new features are dynamic variables and the type POINTER, as well as the ability to pass parameters by reference (VAR parameters). Multiple USER functions and procedures may be declared by name and linked to external assembler routines which now have the benefit of being passed only rigidly type-checked parameters. The facility to assign variables to absolute memory locations enables simple control of memory-mapped peripherals (eg. video boards) as well as allowing the calling of your DOS utilities from within a Pascal program. And much more !!!

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Don't MISS OUT send NOW for a full specification, price list and order form. FLEX versions available now ex stock. Watch out for announcements on availability of OS-9 and uniFLEX versions.

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  - ☆ Stepping Rate.
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  - ☆ User can select the system boot configuration.
- Occupies only 16 bytes of memory space (F760-F76F standard). User selectable to any 16 byte address space.
- Can read and write a single sector by itself. On-board buffer memory allows full interrupt capability in interrupt driven systems. Once data transfer has been initiated, no more processor time is required.
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All of these features are available for immediate delivery on one standard 5½" x 9" 50 pin SS–50/SS–50C card for only $449.00. The price includes DOS68D version 5.1, MONITOR object code on diskette, and a manual with the source listing.

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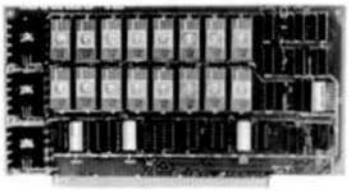
32K S-100 EPROM CARD
NEW!



$74.95 KIT

USES 2716's

Blank PC Board - $34

ASSEMBLED & TESTED ADD $30

SPECIAL: 2716 EPROM's (450 NS) Are $11.95 EA. With Above Kit.

KIT FEATURES:
1. Uses +5V only 2716 (2K x 8) EPROM's
2. Allows up to 32K of software on line!
3. IEEE S-100 Compatible.
4. Addressable as two independent 16K blocks.
5. Cromemco extended or Northstar bank select.
6. On board wait state circuitry if needed.
7. Any or all EPROM locations can be disabled.
8. Double sided PC board, solder-masked, silk-screened.
9. Gold plated contact fingers.
10. Unselected EPROM's automatically powered down for low power.
11. Fully buffered and bypassed.
12. Easy and quick to assemble.

32K SS-50 RAM

$379.00 KIT

For 2MHZ Add $10

Blank PC Board $50

For SWTPC 6800 - 6809 Buss

Support IC's and Caps $19.95

Complete Socket Set $21.00

Fully Assembled, Tested, Burned In Add $30

NEW!

At Last! An affordable 32K Static RAM with full 6809 Capability.

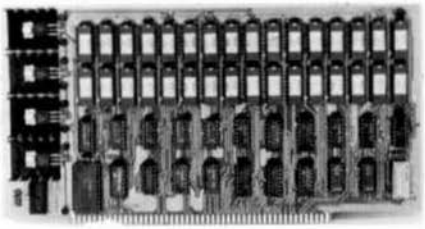
FEATURES:
1. Uses proven low power 2114 Static RAMS.
2. Supports 6550C - EXTENDED ADDRESSING.
3. All parts and sockets included.
4. Dip Switch address select as a 32K block.
5. Extended addressing can be disabled.
6. Works with all existing 6800 6350 systems.
7. Fully bypassed. PC Board is double sided, plated thru, with silk screen.

16K STATIC RAM KIT-S 100 BUSS

PRICE CUT!

$199.95 KIT

FOR 4MHZ ADD $10



KIT FEATURES:
1. Addressable as four separate 4K Blocks.
2. ON BOARD BANK SELECT circuitry. (Cromemco Standard!). Allows up to 512K on line!
3. Uses 2114 (450NS) 4K Static Rams.
4. ON BOARD SELECTABLE WAIT STATES.
5. Double sided PC Board, with solder mask and silk screened layout. Gold plated contact fingers.
6. All address and data lines fully buffered.
7. Kit includes ALL parts and sockets.
8. PHANTOM is jumpered to PIN 67.
9. LOW POWER: under 1.5 amps TYPICAL from the +8 Volt Buss.
10. Blank PC Board can be populated as any multiple of 4K.

BLANK PC BOARD W/DATA-$33

LOW PROFILE SOCKET SET-$12

SUPPORT IC'S & CAPS-$19.95

ASSEMBLED & TESTED-ADD $35

OUR #1 SELLING RAM BOARD!

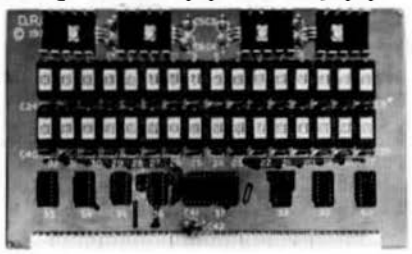
16K STATIC RAM SS-50 BUSS

PRICE CUT!

$195 KIT

FULLY STATIC!

FOR 2MHZ ADD $10



FOR SWTPC 6800 BUSS!

ASSEMBLED AND TESTED - $35

KIT FEATURES:
1. Addressable on 16K Boundaries.
2. Uses 2114 Static Ram.
3. Fully Bypassed.
4. Double sided PC Board. Solder mask and silk screened layout.
5. All Parts and Sockets included.
6. Low Power: Under 1.5 Amps Typical.

BLANK PC BOARD—$35 COMPLETE SOCKET SET—$12
SUPPORT IC'S AND CAPS—$19.95

NEW! **STEREO!** NEW!
S-100 SOUND COMPUTER BOARD

At last, an S-100 Board that unleashes the full power of two unbelievable General Instruments AY3-8910 NMOS computer sound IC's. Allows you under total computer control to generate an infinite number of special sound effects for games or any other program. Sounds can be called in BASIC, ASSEMBLY LANGUAGE, etc.

KIT FEATURES:
- TWO GI SOUND COMPUTER IC'S
- FOUR PARALLEL I/O PORTS ON BOARD
- USES ON BOARD AUDIO AMPS OR YOUR STEREO
- ON BOARD PROTOTYPING AREA
- ALL SOCKETS, PARTS AND HARDWARE ARE INCLUDED
- PC BOARD IS SOLDERMASKED, SILK SCREENED, WITH GOLD CONTACTS
- EASY, QUICK, AND FUN TO BUILD, WITH FULL INSTRUCTIONS
- USES PROGRAMMED I/O FOR MAXIMUM SYSTEM FLEXIBILITY

Both Basic and Assembly Language Programming examples are included.

COMPLETE KIT! **$84.95** (WITH DATA MANUAL)

BLANK PC BOARD W/DATA $31

SOFTWARE:

SCL™ is now available! Our Sound Command Language makes writing Sound Effects programs a SNAP! SCL™ also includes routines for Register-Examine-Modify, Memory-Examine-Modify, and Play-Memory. SCL™ is available on CP/M* compatible diskette or 2708 or 2716. Diskette - $24.95. 2708 - $19.95. 2716 - $29.95. Diskette includes the source. EPROM'S are ORG at E000H.

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SAME AS INTEL 2107B!
4K RAMS AT AN UNBELIEVABLE 50¢ EACH!!!

Prime, new, National Semi., 1979 date coded, full spec, parts. N.S. #MM5280-5N. Same as INTEL 2107B-4, T.I. TMS4060, NEC uPD411, etc. We bought a HUGE QTY. from a West Coast Distributor at truly DISTRESS PRICES! One of the most popular and reliable RAM's ever made. These parts have been used by almost all Major Computer Main Frame Mfg. the world over! Arranged as 4K x 1, 270 NS Access Time, 22 Pin Dip. These units DO NOT use multiplexed addressing, thus making REFRESH and other timing very simple. See INTEL MEMORY DESIGN HANDBOOK for full application notes. The NAT. SEMI. MEMORY DATA BOOK is available at most Radio Shack Stores. Prime units in original factory tubes!

(With Pin Out Data) **#5280-5N 4096 BITS x 1 270 NS ACCESS**

8 FOR $4.95 32 FOR $16

FACTORY CASE (450 PCS) — $180

Sockets Special: 22 Pin Low Profile (With Purchase of 5280's) 8 FOR $1.

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74LS373 - 1.29	Intel 2716-1 (350 NS) - 12.95

NEW! G.I. COMPUTER SOUND CHIP

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DATA BASE MANAGER

The Universal Data Research Data Base Management System (DBMS) is a comprehensive group of programs that allow a virtually untrained person to store and recall vast amounts of information in a computer system to meet individual requirements.

The DBMS is written in TSC Extended Disk Basic and requires at least 48K of memory to operate. All programs use a parameter file to allow easy adaption to individual systems.

The user is guided through these extensive programs by menus and sub-menus grouped by type of function. By simply answering prompts the user can create files, store any type of data and recall or manipulate it. The complex task of maintaining data files on the disk is completely taken care of by the programs, the size of the files is only limited by the disk storage capacity of the computer system.

Transparent to the fixed sector length, sub-records of related information are created only to the size required to conserve disk space. These sub-records can contain as many as 27 different fields of information. Each field in turn can contain either alphanumeric, integer or floating point data.

For those users who wish to write their own specific tasks for the database a complete source listing of all the subroutines is included at no extra charge.

BRIEF DESCRIPTION OF PROGRAM TYPES

CREATE DATA FILES The user specifies the file name, password and type of different data he wishes to store.

BUILD A FILE The user specifies the file name and is then prompted through the fields, he has previously specified, to enter the data he wishes to store. After verification the data is stored and the user prompted for the next group of data.

EDIT A FILE The user specifies which record he wishes and the data for that record is displayed. The user then has the option to alter any data contained by that record. Records can be specified by the actual record number or by the data being looked for by the user.

SORT PROGRAMS To organize the data in the most meaningful order the user can sort any file by any field, create a sorted keyfile or merge two sorted files together.

REPORT PROGRAMS meet the users individual needs reports can be completely customized. From a single record, labels or paginated sheet the user need only select the data he wishes to print and see only the data that meets a specified criteria. Report dfinitions can be saved and used to rerun new reports at any time.

FILE UTILITY PROGRAMS Enable the user to delete records, compress files, or modify any specified field data throughout the entire file. The user may also transfer data from one file to another.

GENERAL UTILITY PROGRAMS A group of utilities is provided to allow the user to view the directory of a disk, change the system date, print a source of a program, compare two programs for any differences or search a program for the occurence of any specified string without ever having to leave the DBMS.

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UNIFLEX	$450.00
DBM1 FLEX	$150.00

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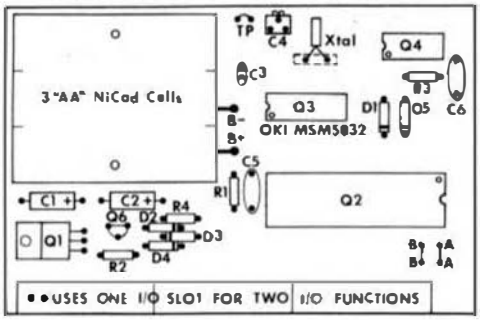
Model 6800CL4 CalClock/TIMER



IT'S A HARDWARE CALENDAR/CLOCK

- Keeps date and time without servicing by the computer
- Day-of-week, month/day/year, hour:min:sec (12/24hr.+ auto Leap Year)
- Hands off setting/control/access of ALL functions via software
- On-card battery and charging circuit keeps time for months, power off

WITH AN INTERVAL TIMER INCLUDED

- For (TSC/Flex2/9® compatible) printer spooling, multi-tasking, etc.

Fully assembled & tested*	$ 99.95	5" Disk (Flex2☐ Flex9☐)®	$ 10.00
Complete kit*	$ 69.95	Goldplated buss connectors	$ 6.00
Bare board*	$ 35.00	Shipping & handling	$ 3.00

* FULLY DOCUMENTED: instructions; diagrams; theory; more than 20 pages of sample software (automatically puts date in Flex2/9® date buffer, adds time-of-day to assembly listings, maintains constant, current time+date display on top line of CRT). Batteries not included. All IC's socketed.

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Price: manual only	$15.00	NY add
tty printer	$135.00	sales
other printers	$150.00	tax

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VC-256

GRAPHICS

The VC-256 is a high resolution graphics interface for the SS-50 bus. The controller incorporates a variety of unique and innovative features which provide excellent display quality combined with EXTREME SIMPLICITY of use. It will drive any monitor with composite video input.

Featuring . . .

- individual pixel control
- true X-Y addressing
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- independent blanking control
- jitter free display
- industrial quality construction
- fully socketed
- no system memory utilized
- no address space occupied
- no splatter on update
- no adjustments
- no software driver
- no software initialization
- no throughput loss

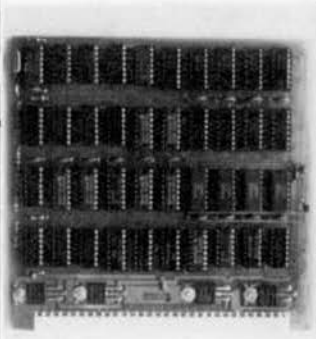
Specifications

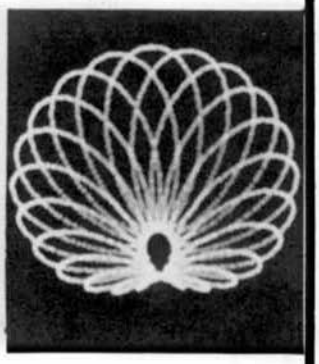
Resolution	256 x 256 (256 x 250 on some monitors)
Bandwidth	8 MHz
Stability	crystal controlled
Addressing mode	X-Y single pixel
Origin	upper left corner
Writing rate	64 microseconds per pixel
Erase time	16.7 milliseconds
Write sync	interlocked
Blanking	program controlled
Output signal	non-interlaced composite video
Memory	65,536 bits in X-Y array on board
Registers	Write: X, Y, Z, Erase Read: status
Port addresses	4 in I/O address space
Physical location	one slot of 30 pin I/O bus
Size	5.6 in x 5.6 in
IC count	40 + 4 regulators
Output	75 ohm coax

SOFTWARE SUPPLIED
(6809 5¼" FLEX™) INCLUDES:

- Camera Digitizer Program
- Exerciser Program
- Character Generator Routine
- Misc. Pattern Programs
- Line Drawing Routine

(All with Source Code)





PRICE: $350 — assembled, tested, and burned in
AVAILABILITY: stock to 30 days WARRANTY: 90 days
Supplied with 6 feet of cable less video monitor connector.

SEE GIMIX AD PAGES 3 & 48

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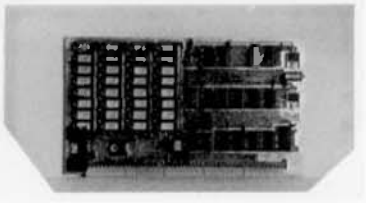

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DSD P/R-32K **$27.00**

32K OR 16K EPROM & RAM MEMORY CARD. 5V ONLY EPROMS AND 5V ONLY BYTEWIDE RAM. (MK 4802, MCM 4016, MSM 2128-1, TMS-4016, HM6516, HM 6116, & TC5516AP). UP TO 4 INDEPENDENT ADDRESSED 8K BLOCKS. CARD SIZE 9" x 5½".
*NOTE 32K of HITACHI HM 6116 CMOS RAM DRAWS 300ma TOTAL.

DSD U P 8255M **$17.00**

UNIVERSAL PARALLEL INTERFACE CARD WITH WIRE WRAP AREA USING THE 8255 PARALLEL PERIPHERAL INTERFACE CHIP. 24 PROGRAMMABLE I/O LINES. (THREE 8 BIT PORTS OR TWO 8 BIT PORTS WITH HANDSHAKING CARD SIZE 5½" x 5". SS-30 BUSS.

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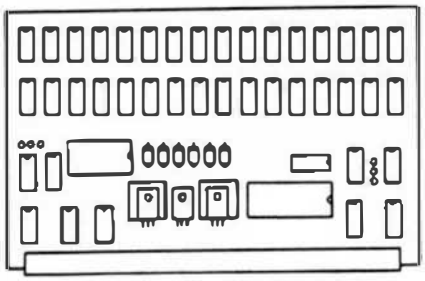

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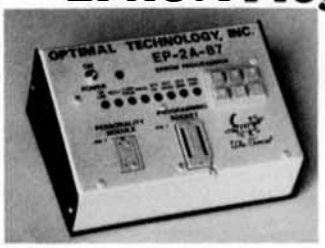
Model EP-2A-87
EPROM Programmer



The Model EP-2A-87 EPROM Programmer has an RS-232 compatible interface and includes a 2K or 4K buffer. During the ON-LINE mode, another computer can down-load to the buffer. Only two easy-to-implement commands are available to an external computer. (Load buffer and read buffer.)

In the OFF-LINE mode, the EP-2A-87 will program, verify, test buffer, and load the buffer from the EPROM socket. During the programming cycle, the EPROM is checked before programming to insure that it is erased and after programming it automatically verifies that programming is correct. Power requirements are 115 VAC 50/60 Hertz at 15 watts.

Part No.	Description	Price
EP-2A-87-1	Programmer with 2K buffer	$575.00
EP-2A-87-2	Programmer with 4K buffer	650.00
	Non-standard voltage option (220 v, 240 v, 100 v)	15.00
PM-0	Personality Module, programs TMS 2708	18.00
PM-1	Personality module, programs 2708	18.00
PM-2	Personality module, programs 2732	34.00
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PM-4	Personality module, programs TMS 2532	34.00
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PM-7	Personality module, programs 2758, TMS 2508	18.00
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XA6809
MACRO LINKING CROSS-ASSEMBLER

This new two-pass program generates relocatable and linkable code (requires LINK68). Resident on any 6800 system, XA6809 lets you produce code for a 6809 right now. This assembler has full macro facilities and features a COMMON section for the production of ROMable code, Conditional Assembly and fast execution.

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Int. $11.95

RA6800ML RELOCATABLE MACRO ASSEMBLER

This two-pass assembler produces a program listing, a sorted symbol table listing, and relocatable object code. The object code is loaded and linked with other assembled modules using LINK68. This book fully describes the 6800 assembly language and all major routines used, and includes flow charts, details on interfacing the assembler. Cross-referenced, showing all calling and called-by routines, pointers, flags and temporary variables.

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**Extra features: *Tone dial capability *2 extra RS-232 serial ports *Real time clock/calendar *2 extra parallel ports

*Asm. & tested, with extra features			$395.00
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*Special parts kit (bare board, 2 filters, relay, and transformer)			$195.00
*Software object and source on flex disk . . .	$10.00	*bare board	$ 49.00

A/T $425.00 ***** SS-50 24K RAM CARD ***** B/C $49.00

*Decoded for extended addressing *6800, 6802, 6809 compatible *6-4K blocks individually addressable 0-F *Low power consumption (typ. 3 amps) *Add memory 1K at a time using low cost 2114L's ($5.00 ea) *Gold edge connectors
A/T with 16K $325.00; with 8K $225.00; with 1K $150.00

A/T $195.00 ***** SP-1 ***** B/C $49.00

*Perfect for the user who wishes to design his own special interface, but doesn't want the bother of decoding and interfacing to the processor buss. Three PIA's, four ACIA's, and one PTM (3-6821, 4-6850, 1-6840) are already buffered and decoded. Three TO-220 regulators (+5, +12, -12) *Pad spacing permits the use of most standard sockets from 8 to 64 pins *Accommodates a mix of 38 14 & 16 pin sockets

A/T $95.00 ***** TRANSITION CARD ***** B/C $49.00

*A component part of Thomas Instrumentation's Backplane System *Contains all the necessary hardware to interface 8 SS-30 slots to one SS-50 slot *Contains all the logic necessary for use with a 6800 or 6809 system *Provisions for optional (not supplied) on-board baud rate generator and slow memory have been made

A/T $95.00 ***** CASSETTE INTERFACE CARD ***** B/C $49.00

*Plugs into Thomas Instrumentation's CPU Card *Uses circuitry licensed from and compatible with the JPC High Speed interface *Includes dual relays for motor control
Software drivers on cassette $25.00 Software drivers in EPROM $35.00

*RCA Keyboards Model 601 $80.00 Model 611 $100.00 CPU Cable $12.00

*Super CPU assembled with source listing but without 2K-EPROM'S (2-2708	$235.00	**BACKPLANES/MOTHERBOARDS**	
*Monitor in two 2708 EPROMS	$ 29.00	*16 Position SS-50	$80.00
*CPU bare card, doc., & source	$ 59.00	*12 Position SS-50	$60.00
*Video ram asm. 7x9 chars 64x16 line	$195.00	* 8 Position SS-50	$40.00
*Video ram bare card, doc., & source	$ 49.00	* 4 Position SS-50	$20.00
*Parallel I/O asm 100 I/O lines incl. 5 PIA's for 10 ports	$139.00	* 8 Position SS-30	$39.00
*Parallel I/O bare card & doc.	$ 49.00	*Connectors: Gold $1.60 ea. (M or F) Tin M $.40 ea. F $.50 ea.	
*Wire-wrap/Prototype bare card	$ 39.00		

Ask about Thomas Instrumentation's Low Cost System and the new Rack Mount Chassis

DEALERS FOR SWTPC, GIMIX, AND TSC

*All Thomas Instrumentation's cards come with full documentation including software source listings where applicable *All assembled cards are burned in at 150F and fully tested with Gold conn. *Bare card prices do not include edge connectors

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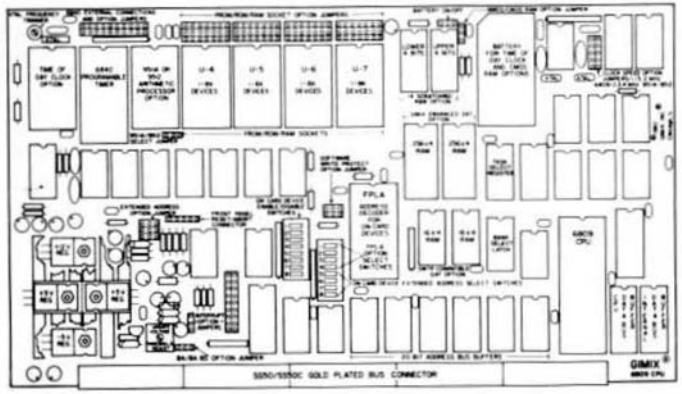
GIMIX 6809 CPU BOARDS for the SS-50 BUS

The GIMIX 6809 PLUS CPU is an extremely versatile board that offers the user a great many features and options which make it an ideal choice for a variety of systems and applications.



- 4 PROM/ROM/RAM sockets for monitors and user software (up to 32K)
- PROM/ROM/RAM sockets individually jumper selectable for single or multiple supply voltage and 1, 2, 4 or 8K byte devices
- 1K bytes of scratchpad RAM (optional)
- 6840 programmable timer with provisions for external clock, gate and output connections
- Time of Day Clock (58167) w/battery backup (optional)
- 9511A or 9512 Arithmetic Processor w/Jumper selectable 2, 3, or 4 MHz. clock speeds (optional)
- FPLA address decoding for the 8 on card devices 4 PROM/ROM/RAM sockets, 58167, 9511A/9512, 6840, 1K scratchpad RAM
- Software switching of address configurations for the 8 on card devices (allows software switching between on board PROM/ROM/RAM resident system monitors)

- All FPLA decoded devices can be individually enabled/disabled
- FPLA decoded devices are available for DMA access
- Extended addressing for the FPLA decoded devices (can be disabled)
- Software switching between on and off board system monitors using extended addressing.
- Jumper selectable interrupts for the 6840, 58167, and 9511A/9512
- Any one of 3 memory management techniques can be used.
  - Straight Bank Select
  - GIMIX Enhanced DAT w/software write protect (optional)
  - SWTPC compatible DAT (required for SBUG-E) (optional)
- Software write protect in 4K blocks, of the entire address space (when GIMIX enhanced DAT is installed)
- Jumper selectable processor clock speeds (1, 1.5, 2 MHz.) (2MHz CPU optional)
- Separate buffers for the 6809 and the on card devices

- NMI input can be jumpered to the bus or to an external connector
- BA & BS jumper selectable for independent or gated operation
- User defined latch output
- Gold MOLEX connectors for trouble free contact
- SS-50 and SS-50C compatible
- Full DMA capabilities (works with any of the 6809 DMA methods)
- Fast Slow memory capabilities
- Fully assembled, tested and burned in

NOTE: The GIMIX 6809 CPU BOARDS do not include a baud rate generator. In systems that require a baud rate generator, it must be provided elsewhere. The GIMIX 6800/6809 mainframe includes a baud rate generator on the mother board.

6809 PLUS CPU #05 (With Time of Day Clock and Battery Backup Option Installed) $548.05

The GIMIX 6809 PLUS CPU board has a variety of other options that may be ordered at the time of purchase or added later. It is fully socketed to allow adding the following options at any time.

• 2 MHz 6809	$ 25.00
GIMIX ENHANCED Dynamic Address Translation	$ 35.00
SWTPc Compatible DAT (required for SBUG-E)	$ 15.00
1K NMOS Scratchpad RAM	$ 11.80
1K CMOS Scratchpad RAM w/Battery Backup (#05 Board Only)	$ 45.00

ARITHMETIC PROCESSORS

9511A (32 bit math w/transeendentals) 4 MHz	$312.00
9512 (64 bit math only) 3 MHz	$265.00

SYSTEM MONITORS FOR GIMIX 6809 CPU BOARDS

GMXBUG 09 is available for all versions of the GIMIX 6809 CPU BOARD. GMXBUG 09 includes advanced debugging capabilities, as well as utility and memory manipulation routines. It is available in both terminal and video based versions. The terminal based version is 2K long and requires a standard ASCII serial terminal. The video based version is 3K long and requires a GIMIX 80 x 24 VIDEO BOARD and a parallel ASCII keyboard. The terminal verison can be upgraded to video based by adding the extra 1K PROM, without modification to the original 2K terminal version.

GMXBUG 09 6809 System Monitor (Terminal Based) Includes PROMS, Manual and Source Listing	$ 98.65
Bootstrap PROM (for GIMIX and SWTP 5¼" Disk Systems)	$ 30.00
Video PROM for GMXBUG 09 (Includes Bootstrap)	$ 30.00
GMXBUG 09 Manual and Source Listing Only	$ 38.62

(GMXBUG 09 does not require a Dynamic Address Translator. However, it can be used with your choice of either GIMIX or SWTPc DAT. Please specify version desired when ordering.)

(GMXBUG 09 requires the 1K Scratchpad option on the CPU board. The price for GMXBUG 09 includes the 1K NMOS RAM option when ordered with the CPU)

To Substitute CMOS RAM with the above (#05 CPU Only)	Add $ 33.20

MICROWARE'S OS9 and SWTPc SBUG-E monitors are also available, contact GIMIX for information and pricing.

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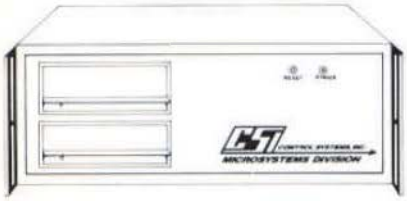

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